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Sale 1880

Mr. Thomas Ruſsell.

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AGRICULTURE

OF

SURREY, &c.

A
COMPENDIUM
OF
MODERN HUSBANDRY,

PRINCIPALLY WRITTEN DURING A SURVEY
OF
SURREY
Made at the desire of the Board of Agriculture;
Illustrative also of the best practices in the neighbouring Counties,
KENT, SUSSEX, &c.

IN WHICH IS COMPRISED
AN ANALYSIS OF MANURES
Shewing their Chemical Contents, and the proper application of them
to Soils and Plants of all descriptions.

ALSO
AN ESSAY ON TIMBER
Exhibiting a view of the increasing scarcity of that important Article, with
Hints on the Means of Counteracting it;

TOGETHER WITH
A VARIETY OF MISCELLANEOUS SUBJECTS
Peculiarly adapted to the present state of the Internal Economy of the
Kingdom.

BY JAMES MALCOLM,
Land Surveyor to their Royal Highnesses the Prince of Wales,
and the Dukes of York and Clarence.

VOL. III.

Argumentum locuples habui. *Strada Prol. Acad.*
Res spectatur non verba. *Cic.*

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1805.

AGRICULTURE

OF THE

COUNTY OF SURREY.

GRASSES, MEADOWS, AND PASTURES.

SURREY is not particularly famed for an attentive regard to the formation, or to the productiveness of its meadows and pastures. Being every where more or less undulated, with no considerable tract of level country in any one part of it, its position seems to bespeak it more of a corn than a grazing or a dairy county. There are, however, some parts of it where the system of meadows is well understood, where irrigation is uniformly practised, and its consequences carefully marked; such are those in Oxted, Tanridge, Crowhurst, and Lingfield parishes on the eastern side of the county, and the long famed Runneymead and other common meads of so valuable a quality, which by bordering on the Thames, were they in severality, would by proper management necessarily make no inconsiderable figure, as before the late inclosures of Walton and Weybridge parishes, they amounted together to near 1200 acres. There is a small quantity of exceeding good meadow about Cobham.

In the parish of Oxted Mr. Wm. Saunders, of Stone Hall, (whom I have before had occasion to name,) has a large allotment of water meadow belonging to that farm, which has been formerly made at a very heavy expence; but he is far from being such a convert to the system, as to ascribe to it all the advantages which its advocates endeavour to maintain. He knew the farm before the meadows were flowed systematically, and he was acquainted with their products; and although he admits that the grass springs earlier, and is greatly increased in quantity, yet he is very well satisfied that it is so much lessened and reduced in quality, that it does not nor cannot fat so much stock as it had used to do within a given period.

Indeed, it is pretty evident from the present appearance of particular large spots over which the water never flows, (and which exhibit the remains of the ancient herbage,) that the quality of it was once uncommonly fine and good, but that the flowing or irrigating had destroyed that particular sweet herbage, and introduced or brought on a species coarse and long, very productive, but certainly not by any means so profitable for cattle, and can only answer where hay can be sold for the London or some other great market. In these ideas Mr. Saunders is by no means singular, for several other farmers who had tried the system upon a small scale, found the same results, and have let their works go to decay.

In the parish of Tanridge, however, Mr. Tirrell, Mr. Hollamby, and Mr. Wm. Steer have each of them very capital water meadows, and which the two former regularly irrigate, and when I looked over them early in the spring of 1803 when there was scarcely a blade of grass elsewhere, their meadows were in a high state of vegetation and over my shoes in grass. To them it pays well, because they are not restricted from selling their hay, and the barracks at Croydon afford them an extraordinary good market.

At Crowhurst and Lingfield along the sides of the river are some very good natural meadows, particularly Broad Mead in the latter parish, but not being in severalty they are but indifferently managed; they, however, contrive to flow some of them at some particular seasons of the year, when such a quantity of water as may be wanted for that purpose can be spared from the mills, which greatly conduces to increase the produce. There are several parts in those parishes, that would pay infinitely better in pasture than as they now are under the plough, but the great uncertainty under which they labour with regard to their tithes, deters the tenantry and even many of the proprietors from attempting any expensive and permanent improvement. I could name one gentleman who, as a farmer in the latter parish, ranks as high as any man in the kingdom, and as a grazier inferior to few, with a spirit to undertake, and a capital to execute whatever plans would tend to the improvement of his farm, and with a command of water that would enable him to irrigate a great part of it, now suffers his grass fields to lay idle and unproductive, and his corn land to yield barely enough to supply him with fodder and to cover his expences; when, with a little exertion, the latter would, as some of them did this season, 1803, produce him six quarters per acre of fine marketable wheat;—and this on account of the unsettled state of the tithes. A considerable part of the several parishes of Godstone, Horne, Burstow, Horley, Charlwood, Newdigate, Ockley, Ewhurst, Okewood, Cranley, Cowfold, &c. &c. being flat, of a strong tenacious soil, too moist for the plough, but not too much so for meadows, (because in a state of arable, and under corn, moist lands are extremely apt to swell greatly in hard frosts, and subsiding again in a thaw leave the roots of the corn quite bare upon the surface; which is not the case when under grass, because they are generally so compressed by treading and rolling, and the matting together of the roots of the perennial grasses, as to prevent the frost from taking such effect upon them,) might be easily converted into very good permanent pasture, and pay in my opinion better upon an average of years, than under corn. Indeed, Horley common of itself, was it inclosed, and proper sized ditches sufficiently deep carried round the inclosures, would naturally become as fine meadow as any in the kingdom. The same may be said of great part of Peas Marsh between Guildford and Godalming; and as that tract of common is about to be inclosed, it will naturally find its value as such, and in all probability be so employed.

In the management of the meadows and pastures throughout the county I have seen nothing new; many of the noblemen, gentlemen, and principal farmers, paying more or less regard to the proper dressing, picking, weeding, bush harrowing, and rolling; and many paying no attention at all to any of these things, either in their meadows or their pastures. Some again there are, who think they cannot overdo it, and therefore on indiscriminately, 40, 50, and even 60 large cart loads of the best and most rotten dung to the acre, upon cool, old, meadows. Such was the case in the parish of Albury, where one gentleman dressed a piece of meadow ground in the winter of 1802, with 40 large loads of rich spit dung equal perhaps to between 50 and 60 cubical loads, when half the quantity repeated at a proper interval, say the third year, would have been of more permanent benefit to the field, and been after each dressing, more productive of good hay. At Petersham, Wandsworth, Battersea, Dulwich, and Streatham, I observed similar errors, and this under a mistaken notion of making the fields for ever, or, as some expressed it, that they would not want dressing again for one while. Probably in this idea they might be also mistaken, for if the soil was near the gravel so as to cause it to burn, and the succeeding summer should prove hot and dry, this superabundant quantity of dung would rather tend to destroy the herbage altogether, in the same manner as an overdose of otherwise salutary beverage would tend to destroy the constitution; why then, if a little will be sufficient to encourage the growth of plants, are we so covetous as to force them to a premature vegetation, and thereby become, as it were, involuntary instruments in shortening their existence?

In many of the upland grounds in the county, and in the parks in several parts of it, that have perhaps been for a series of years depastured by sheep, cows, horses, or deer, I could not help remarking the extreme poverty of the major part of them. Sometimes, indeed, the ant or mole hills, the black thorn, the bramble and brier, are removed from the interior as well as close to the fence or hedge, and all is left smooth; but the grass is generally so choaked up with moss and bent, matted and interwoven together, as greatly to reduce its value, and were it left to grow for hay would not yield half a load per acre. I have been told very frequently in the course of this survey, that such grass is always sweeter for cattle, and makes mutton so much the finer flavoured. I will, for the sake of argument, admit that to be the case, but is there no difference in point of value to a proprietor, whether one or two acres will suffice to fat an ox or a sheep, or whether it must require six or eight acres, or, indeed, whether any number will fat him or them at all? I apprehend, it requires no extraordinary capacity to answer such a question. But if I am asked how such land is to be brought about so as to effect such a purpose, my answer is, by stating what has been done in similar cases, and leaving the party at liberty to adopt it or not as he pleases.

Those who are best skilled in this part of husbandry, dress their meadows or pastures every other year, at least where the scythe goes over; but where they have a good bottom upon a kind, moist, loam, every third year is thought sufficient. No doubt the rich particles of the dung spread upon the surface is filtrated through it, and carried down into the earth by rain, or by the melting of the snow when the dung is laid on in the autumn; but very many of those particles are lost by evaporation by the heat of the sun, and consequently never reach the roots at all. From the consideration of the great waste, and otherwise loss of so important a manure, arose the plan which I shall now submit.

DRESSING.—Early in November when the surface of the soil has been moistened by autumnal rain, a scarificator is put into the field, the tines of which are made sharp in front, and kept so every day, set about six or eight inches asunder, according to the quality and condition of the sward. This instrument may be drawn by one or two horses, having a wheel or foot in front to raise up or let the instrument deeper into the ground. With this the turf is cut asunder, and leaves a scratch of about an inch wide on the surface; the depth is regulated by the thickness of the sward, and the lowness of the roots, but five or six inches is in general the depth. This operation not only tears up a great deal of moss, separates the hide bound (if I may use the expression) coarse grasses, cutting the extreme roots of them, which hereafter shoot out anew, having been nourished by the dung that is to follow, and the air and rains during the winter.

The dung being previously prepared, and undergone its regular fermentation and arrived at a state of perfect putrefaction, must be brought on directly, and as fast as brought must be spread, care being had that the spreader reduces the lumps as small as possible. After that is done, the work is rendered complete for the present by giving it a good bush-harrowing made of strong black and white thorns. By this method of infusing the valuable particles of the dung to the roots of the plants, it must be evident to every one, that one-third less dung will do more real good than can be conceived, and than perhaps three times the quantity in the usual way. Hence arises a cheap and certain way of improving a large quantity of upland pasture, which at present is little more than barren. Whatever moss or rubbish the scarificator may tear up and collect, should be carefully removed to some dung heap to be hereafter mixed with it, because if it is left upon the grass in heaps it will soon destroy it.

To render the plan still more beneficial, before this bush-harrowing takes place, a few pounds of white clover, with some marl grass or cow-clover, according to the quality of the soil, should be evenly sown over the ground; the harrowing following after, and the rains together would force in the seed, and giving it another bush-harrowing and a complete rolling, either in the month of March or April following, as may be most favourable, I should not be afraid to risk my existence upon the apparent and substantial permanent improvement of the pasture.

Preparation.—When land has been improperly laid down, or from great neglect is become poor, foul, and barren, there is no possible mode of recovering it than by ploughing it up, well cleaning, taking a certain number of white and green crops alternately off from it, and laying it down again clean, sweet, and in good heart, without any corn crop with it, and with proper seeds. Nothing surely can be so ridiculous as to see land that is intended to be laid down into permanent pasture, with the seeds sown amidst a crop of corn, and that often oats, and for no other reason that I have ever heard, than that the corn shelters and nourishes the young and tender grasses. That it nourishes them is false, for nothing can be more clear than that they rob the grass of that nourishment which is intended for the grass solely; so far from being of any use in this respect, every corn that grows is in the way of the grass, and let me then ask, if that be the case, whether any one of those plants, be it wheat, barley, or oats, could exist without that very nourishment, which, if they were not there, the grass would necessarily have? But I may be told that what is food for corn, is not food for grass, and therefore no injury is done, because they will each of them draw their own proper food and no other. What proof have we that such is the fact when applied to plants in the earth? Have we not, on the contrary, the strongest reason to believe, as well from the evidence of our senses as from the knowledge we have acquired by chemistry, as to the component parts of every soil, that the soil which will nourish the one will do the same by the other? But if it should prove otherwise, it can only be partially so: and a little more sand, chalk, or clay, in the one soil than in the other is all the difference that can be made in the quality of it.

Far different will be the case as to the nominal advantage of shelter, for it is not only nominal but highly injurious, as I hope to be able to prove.

When grass seeds are sown among corn for the purpose of shelter, be the crop of corn heavy or light, it draws up the grass more or less spindling, in proportion to the respective degree of thickness of it; and it may truly be said to afford it protection, at a season of the year when it stands in no need of its officiousness; for nature has provided it, if left alone, with the means of protecting itself. When thus drawn up among the corn, if that tillers out, as most corn that is sown then, and in a tilth made proper for grass seeds, always does, its roots being so much stronger than those of the grasses, and having taken complete possession of the ground before they have begun to vegetate, those roots trail as it were near the surface, and do not offer to shoot downwards until they have nearly exhausted every particle of nourishment from it. What becomes then of the seeds of the grasses? They may vegetate it is true, but what have they to support them when they are brought into existence? Exactly what the roots of the corn have left them: they cannot shoot downwards, except in a few intervals, because the roots of the corn are in their way, they are therefore always found with the greater part of their roots out of the ground. When the crop of corn is cut and carried, those roots are exposed to the scorching sun, without leaves sufficient to counteract its effects, and they are afterwards farther exposed to all the severities of the winter, when if shelter and protection is necessasy, (and they then stand undoubtedly most in need of it,) they have it not. If the season proves very dry, the grasses are starved; because the corn will run away with what little moisture there may be in the earth to support themselves; and if otherwise very wet, or even moist, the corn will grow rank and smother the grasses; thus in either case the principle is false and bad. But covetousness set the idea afloat, and ignorance, obstinacy, and folly, have kept it from sinking. For what is it but saying, that the spring and summer months in this country are too cold, or too hot to nourish and bring forward a crop of young grasses, which, in fact, are almost all natives of the greater part of this kingdom, without the assistance of any preternatural agency. The idea is too absurd to be maintained, and I am happy in having it in my power to say, that those gentlemen whose estates I have the honour to manage, as well as others who have consulted me in the arrangement of their landed property, have admitted the principle I now maintain, many of them have made trial of it, are become converts, and now make it one of the special covenants in all their leases, viz. never to sow corn and grass seeds together, when the land is to be laid down to permanent pasture.

Before I conclude this part of the subject, I must beg to add one word more. When grasses are sown by themselves, if from the badness of the season, (and the spring has been made choice of for sowing the seed) or the indifference of the seed, the plants should not vegetate kindly, it gives the farmer an opportunity of top-dressing such as are weakly, and supplying any part of the field with fresh seeds where they may have failed altogether: it allows him from time to time to hand-weed and extirpate any weeds or grass that he does not choose should make a part of the crop, and this he can do more effectually while they are young, and with less injury to the whole than when they are suffered to get firm root in the ground. Indeed, the pulverized and open state of the ground seems to invite the operation at this particular period. But I have been told, that all this is attended with a great deal of trouble, loss of time, and expence. What, shall we make a rule to weed our crops of wheat and other corn, which are only annual, and not of so much consequence, and yet deny or grudge to perform that office to a crop that is to be permanent? If we should form an unfavourable opinion of a tenant for making use of such language, because he may alledge that he has only a temporary interest in the premises, and by laying it down he has performed that part of his contract; what shall we think of the proprietor who entertains the same ideas? If I am right in what I have before advanced, I would beg leave to ask, whether any of these things can be done when the grasses are sown amidst corn? Can you weed from time to time? Can you top-dress, can you supply any vacancies during the growth of the corn? If you cannot, why then you are losing a season with your crop of grasses, you have it all to do the second season, when common sense and experience tells you it cannot be done with scarcely any prospect of success; and such a piece of pasture, I will venture to say, will always be patchy, and never look well, take what pains you will with it afterwards.

SEEDS.—Having now pointed out what I conceive to be a fundamental error in the custom and practice of sowing the grass seeds among corn, I proceed next to say something of the seeds that are generally used for that purpose. I trust I shall be excused in what I am going to advance, because part of it at least will infringe upon custom, which I well know to be very difficult to set aside; but if a great number of years experience as a dealer in seeds, and during the whole of that period, an anxious solicitude to find out those sorts which may be best calculated to form that carpet-like appearance in every soil and situation, which as a ground-workman it was my business to do, and which my subsequent and late engagements have enabled me to apply to the farm; if that experience has furnished me with any knowledge, such as it is I am happy in the opportunity of conveying it to the public, through the medium of this survey.

Let us first take notice of the usual sorts of seeds employed in this county, (and which will be found nearly the same all over the kingdom) in laying down land either for meadow or pasture, and contrast it with the sorts I shall beg leave to submit.

Whatever be the quality of the soil, be it wet or moist, or be it dry or scalding, whether it is clay, loam, sand, or chalk, whether it is for upland or for lowland, you are told to take so many pounds of red clover, so many of white, so much rib grass or plantain, so much rye-grass, and so much clean hay seed, with now and then a little trefoil and cow-clover or cow-grass; such is the universal doctrine, and so established is this rule, that if a gentleman goes to any eminent seedsman in town or country, and tells him that he wants a proper assortment of the best seeds to lay down a certain quantity of land, the seedsman has his recipe ready in an instant, and which has probably been as long in the shop as the business; he naturally enough thinks, that if the gentleman with his steward and bailiff, all of whom may have consulted the most experienced farmers in their neighbourhood, cannot tell what is most proper for his soil and situation, and the purpose for which it is intended, and who alone ought to know, he cannot afterwards blame his seedsman for having sent sorts that were by no means fit for his purpose, but perhaps the major part of them the very opposite. And yet not a winter passes over a seedsman's head, but he has many such applications. Indeed I have sometimes been in a shop of that sort, and have heard such recommendations given, as to have made me scarcely able to contain myself, and convinced me either that he knew nothing about it, or that he was recommending such articles as he had got to sell, leaving out such as he had not got. But how should he be otherwise than ignorant; a man shut up in London the greater part of the year has not opportunity, nor perhaps inclination, to study the natural history of grasses; he knows the clovers, rye-grass, and the like, and that is the extent of his knowledge; he is properly the seed seller, not the seed grower.

With respect to red clover, I conceive it to be an improper grass to mix with perennial ones, not only because it soon wears out, but because it is a luxuriant exuberant growing plant, and occupies that space while living, which ought to be devoted to those plants which are abiding; and if it does not destroy by its umbrageousness the more young and delicate grasses, it leaves a vacancy when it dies, which is never afterwards so well filled up.

The rib or plantain-grass (plantago lanceolata) is certainly a valuable one in its proper situation; but that never can be indiscriminate, it cannot grow equally well and flourish in all soils and situations alike, there must and will be shades, which he that has paid much attention to it cannot fail to have observed strongly marked; it is upon this ground, that I differ with some highly respectable characters in the county, who ascribe to this plant, and white clover, the exclusive privilege of being alone fit to lay down every species of soil. In its native state it is always found to strike deep in the ground, and hence it is inferred that it is peculiarly fit for upland pastures, and very dry soils; but will it grow equally well there, and be equally productive as in the more moist soils of meadows? Never that I have seen; if other grasses are not to be got, there is no objection to a portion of rib-grass upon any soil, but I should still prefer it in its proper situation.

Trefoil or nonsuch is by no means calculated for meadows, it is always found spontaneously on the sides of hills, and in the driest situations and soils. Its nature, therefore, bespeaks it as a plant fit for the different descriptions of sands, gravels, and chalks, it is besides a trailing plant, and not an abiding one, and is therefore, more fit to be sown by itself as a crop, than to be intermixed among a collection of grasses even for upland pastures, and never among those intended for meadows.

If any plant can be called generally useful it is the white clover, commonly called white Dutch clover, owing to our being supplied with the greater part of the seed sold in London, &c. from the Dutch, who are themselves principally supplied from Flanders, but it is certainly a native of Great Britain. It accommodates itself to most soils and situations, and will flourish where the red clover and many of the grasses will stand still. I am a warm advocate for its introduction, therefore, upon all occasions; because, although it never grows tall nor exuberant in any situation, yet it forms so complete a bottom in every one, and is so hardy and sweet as to make it valuable either for sheep or cow pasture.

The clean hay-seeds are a gross imposition on the understandings of the public, and it is high time they were undeceived; I have bought many hundred bushels of them at the King's-mews, (which is the famous place of sale) and I cannot well be mistaken about their qualities.

It is a fact pretty well known and admitted, that the purveyor of the king's stables uniformly buys the best and sweetest hay, from the most famed pastures in Middlesex, for the consumption of his majesty's stud, that he can procure, and it is but reasonable to suppose that the seeds proceeding from such hay is the actual produce of the finer grasses; no such thing however is the fact. Every man who knows any thing of Middlesex, and the hay-making of that county, cannot but be sensible that the hay farmer always mows his grass as soon as it comes into blossom, that is to say, as soon as the face of the field exhibits it in regular blossom, he not only does that, but he carries it and stacks it as soon as possible, in order that it may attain its proper degree of fermentation, (vulgarly, sweating) which is not many degrees short of taking fire, and which in very dry seasons they often do, because the hay is then thought to require so much less making. If then the grass is cut while in its early blossom, from whence comes the seed? And if some of the earlier grasses, rye-grass for example, festuca, &c. &c. should have perfected their seeds before the crop was cut, they have still to pass through the fiery ordeal in the rick, before they can come into the king's stables; and can such fine seeds, covered as they only are with a very thin plumula or arillus, which is the Linnæan term for a coat, after having gone through this sweating or heating, escape unhurt? It appears to me, I confess, very unlikely, because we well know how soon the principle of vegetation is destroyed in corn, and very few there are who will choose to buy it mow burnt. The grasses, therefore, that escape the most unhurt, are the rye-grass, avena or oat-grass, and the foxtail-grass, but the former always in the greatest abundance, wherefore, when the usual quantity of rye-grass is added to the collection at the time of sowing, it is no wonder if the field should appear all rye-grass. This is, however, literally the case, and whoever will be at the trouble of examining with a microscope the seeds which they may get from this place, or the finest hay seeds they can buy from any other, if they have passed through the hay stack, will find that nine-tenths of what they believe to be seed is nothing more than the seed vessel without any seed to be found, and therefore mere chaff; because, as I said before, the seed perhaps was only formed when the grass was cut. Hence arises that constant disappointment and chagrin which uniformly attend on those who sow these seeds, having flattered themselves with the expectation of seeing, in a few years, their own fields look equal to, and prove as good as those in the county of Middlesex.

As for the fine Yorkshire hay seed, (holcus lanatus) which is in so much repute among the seedsmen, and which they therefore recommend upon every occasion, it is a worse grass either for meadows or pastures than almost any grass with which I am acquainted, (I leave couch and such rubbish entirely out of the question.) I have tried it in such large quantities in this county, at Sir Robert Clayton's, at Marden; at the Earl of Derby's, at the Oaks; at Joseph Windham's, Esq., at Woodmanstone; at the late Daniel Macnamara's, Esq., at Streatham; at the late Robert Hankey's, Esq., at Fetcham; at the late Edward Walter's, Esq., at Berry Hill; at Woodhall Park, the then seat of Sir Thomas Rumbold; but now of William Smith, Esq., the brother to the late President of the Board of Agriculture, Lord Carrington; in very large quantities at the late Earl of Bute's, at Highcliffe; at Thomas Williams's, Esq., at Great Marlow; and at a vast variety of other places for so many years, that I cannot be mistaken as to its qualities. The wonder, perhaps, will be, how I came to use it so long, knowing so much of it as I did; the answer to which is, that with the exception of the clovers, rye-grass, and the hay seeds before-mentioned, there was no other sort to be got, and as these Yorkshire hay seeds were generally very clean, and free from weeds, they served to mix with the rest, and produce a variety of feed, for cattle rather like the plant than not. Of late years, at least eight or nine, I have never sown any of it, and have dissuaded my friends from buying it. Its character being a soft, woolly, tufty, unprofitable grass, always growing in a bush, much above the common level of the ground, not tillering out, its leaves broad, and the hay uncommonly coarse; it is always neglected, says Mr. Bailey, by all kinds of stock, but when drove through necessity to eat it.

Since, therefore, there appears so much difficulty in procuring a ready and proper assortment of seeds, either for meadows or pastures, or for the different qualities of soils, no wonder, I think, that gentlemen should be so much afraid of breaking up their old sward or pasture, be they never so bad, so long as the common cry is, that you will never see them so good again; and this accounts for the uniform aversion which all landlords have against suffering tenants to break up grass land.

Having detailed what is the usual practice among agriculturalists in this county, and given a concise account of the several grasses employed therein, I will next endeavour to shew what ought to be done. But before I do that, we must first consider to what purpose the pasture is to be applied; perhaps I may be laughed at for hazarding such a question; but that it is absolutely necessary to be previously known there can be no question, and it is equally as proper to consult the nature of the soil, and the situation, before you determine any thing, as it is to make it all perfectly dry and sound first.

If land is intended principally for sheep, which may be supposed to be upland, and consequently dry, the soil calcareous or silicious, we should naturally say that white clover, trifolium repens, trailing clover or trifolium procumbens, fescue grass, festuca, in which sheep much delight, sweet vernal grass, anthoxanthum odoratum, annual poa, poa annua, a certain portion of improved perennial rye-grass, and probably a little rib-grass, plantago lanceolata, by way of variety. If the ranunculus flammula should at any time be found among it, it ought to be extirpated, as according to Curtis, it produces the rot in sheep.

If the pasture is undulated ground, and not intended for sheep, its position seems to design it for horses and for hay, especially if the soil be loamy, either light or strong, I should sow white clover, rye-grass, sweet vernal grass, the meadow or cow clover, trifolium pratense minor; marl grass, trifolium flexuosum; perennial tufted vetch, vicca cracca. There is scarcely another that I should recommend; for although cattle pressed by hard necessity and hunger may and will feed upon vegetables less grateful to them, yet it is not to be doubted but that they are not equally well nourished by these as by others. We see that horses when pressed by extreme hunger will eat dead hedges; we know that men who have been besieged in a garrison have eat cats, dogs, horses, and even human flesh, yet we cannot from thence conclude that either the one was good food for man, or that the wood was good food for horses. Every man who has been accustomed to observe the actions of a horse in feeding at grass, cannot but have remarked how nicely he picks over the ground, selecting, no doubt, such as is most grateful to his palate; if, therefore, our pasture is to be fed by horses, either green, or when made into hay, surely it should be our study, at laying such down to grass, to combine those sorts in which he delights, leaving out the others which he does not seem to relish so well; since one acre so perfectioned will go as far as two or three where an indiscriminate collection has been used. Nor will this assortment be altogether unprofitable for black cattle, who will find an abundance to pick up and graze upon, after the horses may be removed.

Meadows being low, either dry as in the neighbourhood of the Thames, upon a loam with a gravelly substratum; or moist, as in the parishes of Oxted, Lingfield, Crowhurst, and Tanridge, upon a loamy clay, and generally with a much deeper mould, are depastured by cows for the dairy, or by fatting stock; a different sort of collection must be made, consisting mostly of the siliquose plants, and first the true burnet, poterium sanguisorba, are among the most valuable meadow grasses, poa pratensis and trivialis; foxtail-grass, alopecurus pratensis; tall oat-grass, avena clatior; trifolium pratense and flexuosum. Meadow burnet, sanguisorba officinalis; cow-weed, chærophyllum sylvestre; meadow sorrel, rumex acetosa. The tribe of orchis is supposed by many old farmers to be strongly productive of venery in cows. The ranunculus or crowfoot, and the caltha palustris abound much in some old meadows, and it is inferred from thence that they occasion the butter to be yellow, but Linnæus is decidedly of opinion that they are not the cause, for he says in his Flora Lapponica, that cows never touch the ranunculus or the caltha, and indeed as far as my observations go, I think he is right, but it is very evident that neither all meadows nor all pastures will produce butter equally yellow, and he has been led to think that it was owing to the cow-weed, chærophyllum sylvestre, that this yellowness proceeded, because he always found that plant in greater abundance in those meadows, than in others where the colour was uniformly pale or but lightly tinged. This, therefore, is another proof how incurious country people are about things they are every day seeing, and in which it concerns them so much to know. What an advantage would it be for the country gentleman who has learning and knowledge to guide him, with opportunities of time and place, to make a few experiments upon a small scale, the plan would amuse him at a very little expence, while, perhaps, he may be rendering the greatest possible good to his country. We know very well that there are many plants which are eaten greedily by cattle in the spring, which no inducement whatever can tempt them to touch at any other part of the year, because then they become rank in taste and smell, or stalky and hard. Thus the poor people eat the blind nettle, lamium album, in the spring, but never touch it afterwards; again, some animals eat the flowers, but will not touch the stalk, others eat the leaves, and will not touch the stalk, yet we are apt to say, that they eat the plant, although it is very clear, that if it was so, there would be but very few plants they could be said not to eat. Again, many plants that are consumed in an early period of vegetation, and are in that state perfectly grateful, as much, perhaps, from their tenderness, and the powerful desire for change that all animals possess, and especially after having been fed upon dry food, or sour, hungry, scanty, winter pasture; yet many of these when made into hay, make but a very coarse and ordinary food. As on the other hand the less palatable green food may make very sweet hay.

It is pretty evident to me, that wherever sheep have been kept any time in moist meadows in the spring of the year, just after a fresh, or perhaps the first growth of grass, that they become diseased, not from the natural moisture of the place, as it is supposed, but absolutely from the plants which grow there. In this opinion I am not singular, because many farmers have shewed me their meadows and their sheep in confirmation of this doctrine, and seem to be of the same way of thinking. They say that sheep, after having been kept on coarse rowen, and whatever else they can get at, find the spring come on with a flush of grass, full of sap, to which they are put from this hard living; and which being young and tender, all alike become food to animals almost in a state of starvation; they do not pick here and there as the horse does, selecting nothing but what is wholesome and pleasant; but they take the poisonous plants as well as those which are not so, and devour every thing before them. For example, among a great variety of wholesome grasses are often to be found the scorpion grass, the dog's mercury, the butterwort, spearwort, spiderwort, lousewort, sundew, and some others. Wherever a quantity of these prevail, if they are not absolutely poisonous, they are unquestionably noxious, which perhaps may be the next degree to it; and sufficiently so, no doubt, to generate those diseases which are apt to attack sheep at that season. Very few farmers know any thing about grasses; they may, perhaps, be acquainted with a few of them, and they may have heard that such and such are poisonous; but unless they were to see the animal eat the plant, and die as soon as it had devoured it, they would not be persuaded that it was the cause of his death, much less then would they be induced to extirpate the plant altogether. It is surely in instances of this sort, that men of fortune and science have it so much in their power to render the greatest service to the community from their inquiries, their experiments, their consequence, and influence, and their example.

SEED TIME.—Having pointed out the sort of plants necessary to compose each kind of pasture, the business is not complete until the seeds are sown, &c. I will suppose that no man would think of sowing his ground but under the following conditions; that it is first made most perfectly clean, and free from every species of root weeds; and that it is secondly put into the best possible heart, and that all the ditches were made perfectly open and of a proper depth. If the land is strong and rather cold, I should take the first moist weather in August; and even if not moist, if the ground is well pulverized and in fine tilth, I should sow it then. If the ground lies warm, of a kindly loam or sand, I should wait until September; (when I speak of these months, I always mean the early part of them unless otherwise expressed;) by sowing the seed at this season, the ground is warm, has had the most favourable season for destroying every species of weed, and getting the land finely pulverized, and fit to receive such delicate seeds; the plants will very soon make their appearance, especially if a few gentle showers should fall, if not, the evening and morning dews are then so strong as greatly to assist them, and in proportion to the natural or artificial richness of the soil, they will take such hold of it before the frosts set in, as to be in no danger of being rooted out; nevertheless, to guard against any chance of such an event, the ground should be rolled during the months of October or November, as the plants by that time will make a good appearance; the rolling will not only press the ground more closely about the roots, but will break the clods, and prevent the frost from taking so much hold of the ground; it besides leaves the work in a more finished state. This rolling must also be repeated in March, which will be the means of uniting the sward more closely at the bottom, from whence a good crop of hay may be expected the ensuing summer.

I am no advocate for spring sowing, the months of March and April abound in dry, harsh, piercing, driving winds, seldom a day is calm enough to sow with regularity so light a seed, and should the land be light, both that and the seed together stand a chance of being blown away; when it vegetates, although otherwise hardy, it is subject to be pinched and checked, which is not the case in autumn, for it has then the most kindly season in the whole year to vegetate in. Besides, whoever will carefully attend to nature's unerring laws and operations, will find that the seeds of most grasses vegetate almost as soon as they have dropt from the seed vessel; the outer covering is so thin and delicate, and the active principles of vegetation so strong at that season, that the seed strikes root almost immediately, which plainly points out that season as the fittest time to sow the seed.

In sowing the seed, care should be taken to sow the poas and the lighter grass seeds properly mixed together first, then follow after with a scattering of the trifoliums or clovers; for were they put into a measure or seed cut together, the weight of the clovers would make them sink to the bottom with the least motion, by which means the ground would be unequally sown.

After the seeds are sown the ground should be harrowed with a short tined harrow, or which perhaps is better, a strong bush harrow made of black and white thorns; this will bury the seeds more evenly than the toothed harrow, at least I have never used any other; and in two or three days run a barley roller over to break the clods and settle the ground. After the plants are come up, they must from time to time be carefully weeded, in order that every weed may be removed while young, and before they have been able to do any injury to the crop. This operation is of the utmost consequence to the future well doing of the plants.

I have said before, that by sowing the seeds in the autumn, a fair crop of hay may be expected the following summer; but although I say that, I should by no means advise the grass to be mown, I would much rather it was fed off by sheep, and those sheep to be lambs. In the first place, their treading the ground after a cold and very frosty winter, which may have loosened the ground more than the roller can properly settle, will fix the plants uniformly and steadily in the soil, their dung and urine will enliven and invigorate the plants, and the lambs, by their age, will not be able to tear and root up so many of the young plants as older sheep; however, where lambs are not to be had, sheep must be resorted to, and it should be so sufficiently stocked as to keep the plants well fed down, which will cause them to tiller out on all sides and form a complete carpet.

In case hay is very much required the following summer, the grass should be close fed down in the spring, afterwards well bush harrowed and rolled, every noxious weed carefully taken out, and all stones and rubbish as carefully removed; it may be shut up for a crop about the middle of May, which, as soon as mown and carried, should have a light but very even sprinkling of rich rotten dung over it. The first rains will wash it into the ground, and by invigorating the plants, increase the quantity of perspirable matter, which, together with the evening dews, will keep the ground moist should the future rains be never so trifling; if it is then bush harrowed, the plants will soon feel the good effects of it, as it will tend to fill up the holes made by the worms at this season of the year in quest of food among the dung, and cause it more readily to penetrate to the roots of the plants. As soon as the grass has made a good shoot, so as not to endanger the exposing of the ground to the dryness of the autumn, I should again advise the lambs or sheep to be turned in, and so continue in and out all the winter, if the land is dry enough to bear it, and the following and every succeeding season, after being picked over, well bush harrowed and rolled, it may be fed over with any sort of cattle, or mowed at pleasure.

It is to be remarked, that I have said that the field may be mowed the second season in case hay is likely to be very much wanted. I should not most certainly mow it if it could be avoided, for the longer such a crop is before it feels the scythe and is suffered to exhaust itself in growth, the stronger root it will have in the ground, and the crop be so much the more firmly established. I have in some seasons upon a pretty large scale, folded slightly my plant of grass the first season with lambs, and especially where the soil was not of the very best quality, and I have found the very best effects arise from the practice; it is evident that too much pains cannot be taken in firmly establishing a crop, both as to vigour and purity, that is to be an abiding one, and that will be every day, as it were, telling us that we have either starved it from ignorance or covetousness, or spoilt it from not knowing how to have gone about it.

In laying out fields for pasture, it is a good plan to have pounds fixt to such a corner of a field as may serve four; they are handy to drive stock into in case of an accident to examine them, and the expence in erecting them is no great deal. By the same rule, it is of the utmost importance that they are well supplied with sweet water, to which cattle may have constant access; if ponds are to be made, they should also be so contrived as to serve four fields. Hedges should not be suffered to grow rude and high, because they prevent the due circulation of air.

It gives me much pleasure to find since writing the above, that one of our very best practical farmers, Mr. Drewett, of Send, from whom I have received the greatest civility and attention, most perfectly coincides with me in opinion as to the mode of laying down ground into permanent pasture. He has lately done a good deal in a stile and manner very different from the old custom, that does him the highest honour; indeed, the manner in which the ordinary business of his farm is conducted, shews him to be a man of observation, penetration, and capacity, and fully justifies the expressions made use of by the gentleman, one of the most active and enlightened members of the Board of Agriculture, to whose kindness I am indebted for an introduction to him.

In laying down his land, it is but justice to say, that he cleaned it and prepared it in the best stile of husbandry; that he levelled it with the skill of an expert ground workman; that he selected his seeds with the care and diligence of an able botanist, (with which science he has made himself acquainted,) and lastly, that he has sown them without a crop of corn, and is now giving the field a coat of dressing, which, I have no doubt, will have a good effect, and eventually amply repay him for his assiduity, care, and skill.

Produce.—The uplands, from one ton to one and a half, according to their respective qualities, and the care that may be taken of them. In the lowlands or meadows, the produce is from one and a half to two tons and better of hay.

Consumption.—Within a day's journey of the barracks, or of London, the greater part finds its way there; that which is consumed at home is given to cows, oxen, and horses, and in very severe weather, when turnips and other artificial feed is not to be got, hay is then given to sheep.

A Sussex or Devonshire ox will eat from eleven to twelve hundred weight per month.

A cow of the same breed about nine hundred weight.

A strong cart horse about seven hundred weight, with the addition of corn.

A saddle horse about five hundred weight, with corn.

Four acres of the best meadows will keep 100 South Down couples three days.

Note.—I have to remark the most flagrant want of attention in the farmers about Merstham, Gatton, and Nutfield, respecting their meadow land. Not a ditch is scarcely ever scoured out, but full of all sorts of filth, and consequently every little rain lodges on the surface, because it cannot pass off till they become perfect sponges; instead of fine grass we find rushes, with black and white thorns, briars, and brambles, mole hills, and the Lord knows what of trumpery; hedges, gates, and stiles so perfectly in unison, that one might actually fancy oneself transported to the wilds of America; and as if the land was of no value either to landlords or tenants.

ARTIFICIAL GRASSES, RED CLOVER. TRIFOLIUM PRATENSE.

Diadelphia decandria. Linn. Sp. Plant.

There are 46 distinct species of this celebrated plant mentioned by Linnæus, and no doubt there are many more which remain to be described in the succeeding volumes of Professor Wildenow, as the latest goes no further than Monadelphia.

This plant is grown in very large quantities in every part of this county in regular order with corn crops, as well in the inclosed arable lands as in many parts of the common field arable land, and no doubt would be so generally, if it were possible to bring men into one way of thinking, not to encroach in the most distant degree upon the property of their neighbour, because the law has not yet authorized the proprietor to circumscribe it with a fence. Until that has taken place; mankind must be content to do as their fathers have done before them.

The PREPARATION for this seed, according to the present system, is comparatively nothing at all, because it is usually sown among barley, wheat, or oats; but the numberless failures experienced from that mode bespeak it an improper one, and unquestionably prove that it is contrary to the natural order of things. I have been told by some farmers, that this plant requires no extra preparation of the soil when it is sown among corn, because, if it is properly prepared for that, as undoubtedly it ought to be, it is in a fit state to be sown with clover. Just so, then, we might say, that if the ground is duly prepared for clover, it is in a fit state to receive a crop of corn, whether barley, wheat, or oats, but experience tells us that is not the fact; every sort of grain and seed requires its particular preparation of the soil; its particular season for sowing, and its particular treatment while growing; and for the reasons I have assigned in the preceding chapter for laying down meadows and pastures, red clover ought (to insure a regular crop) to be sown by itself.

SEED.—In the strong loams and clays, from 14 to 16 pounds of clean seeds are sown to the acre, with wheat or oats; on the chalks and sands from 12 to 14 pounds, with barley. I have said clean seeds, but it is a remarkable circumstance in the annals of farming, that a farmer will oftentimes buy the best and cleanest seed he can get, yet, when he saves it himself, he neither dresses it so well, and after saving and selling the best at market, he is often content to sow the offal. It is generally sown unmixed with trefoil or rye-grass, if the hay is intended for sale, but if to be consumed on the premises, it has every now and then a portion of the one or the other, or as it sometimes happens, of both.

SOWING.—As it is uniformly sown among spring corn, the time of sowing must depend upon the period at which that is sown. When sown among oats upon the stronger soils the beginning of March, and through that month is the usual time. Among barley after peas, or after turnips upon the lighter soils, the months of March and April, (and some as late as the beginning of May, this year particularly,) appears to be the season. When those seeds are sown, clover follows at the last harrowing, by which means an unnecessary trampling of the ground is avoided, and the finest tined harrows are used for that purpose, once or twice in a place, and the barley roller follows either immediately or in two or three days afterwards. It is not the custom to sow clover among wheat, unless that crop is likely to be very light; when that happens, the month of March is chosen, and as early as the land is dry enough to bear the operation, and the soil is in general finely pulverized and shaken to receive the seed; the small harrows are passed over the crop, and it is finished with the roller as before. It is sometimes sown among beans.

CULTIVATION.—The attention that is paid to this plant is more uniform on the west side of the county than on the east, and greater in the middle and near to London than either of the other parts, particularly as to manuring and dressing the crop; the reason is, that the produce of the latter is invariably sent as hay to the London markets, where quantity and quality are material objects, as they ought to be every where, while that of the former is mostly consumed at home. The time of laying on the manure, however, varies much in every part of the county; but it seems to be admitted on all hands, even by those who do not practice it, that the most proper time for laying it on is the autumn, whereas it is for the most part done just as convenience suits; no inconsiderable quantity having been manured while I was writing this in January and February, and that with coal ashes, rotten dung, or the produce of the different mixens. Is it not to be lamented that these operations should so depend upon casualties, and that so little of system is adhered to in the several departments of husbandry?

The necessity, however, for dunging in the autumn is great, and proceeds from a cause of which farmers are not at all aware. In the preceding chapter I think I have proved that when seeds are sown with a crop of corn, they are uniformly drawn more or less out of the ground according as that crop is light or heavy, and consequently, that as soon as that crop is cut and carried, the roots of the seeds are exposed to the autumnal sun, and are liable to be further and perhaps altogether drawn out by the frosts during the winter, and thereby to perish. On this ground, therefore, to manure the crop in the autumn appears to be the highest policy, in order that the roots may be somewhat protected, and encouraged to penetrate downwards in search of this fresh pabulum. To this dunging should be added a sound heavy rolling as soon as the ground has received a sufficient soaking with rain; by this the plants would experience incalculable benefit, and be effectually secured against frost. By referring to the article gypsum in the chapter on manures may be seen an extraordinary account of its effects when applied to this plant.

Harvesting.—When this crop is mown for hay, it is customary to do it as soon as the general appearance of the field is in full blossom, and while the plants are in their full vivid purple glow. It is bad policy to wait until the heads begin to turn brown, because then the under leaves fall off, and a certain loss of part of the crop is the consequence;

and it besides loses in sweetness and flavour what it gains in toughness.

When the crop is large and rank it is mowed with cradles to the scythes; the swarths are left as they fall from the scythe, without any teddering, as it is termed, or turning until they are nearly two thirds dried through. The swarths are then turned clean over with rakes, as fast as the dew leaves them in the morning, and on the following morning at the same period, they will be fit to cock, and may be carried without loss of time.

Supposing no rain to fall, and the weather to be fine, the fourth day is the usual period at which the crop is carried; but, by taking a handful of the plants and twisting them, if they are tough and do not break, and the swarth makes a rustling noise upon being moved, they are then said to be in a fit state to be carried. If the weather proves wet the swarth is not touched on any account. In heaping and loading, the less it is shook and disturbed the better it is for the hay, as it is an object to get it both expeditiously on the rick, and with as little moving as possible; and being regularly spread over the rick it heats uniformly and settles closely; neither of these, however, will be the case if it be got in wet or overmade; in the first case, the hay will turn mouldy and prove very prejudicial to the cattle, that for want of any other may be obliged to eat it; and in the second, for want of its due quantum of sap, it will never ferment or heat in the rick, but will come out hollow, harsh, and dry, with little or no nutriment in it, and consequently of but very small value. Several experiments have been made by strewing salt over the layers of clover as they were thrown upon the rick; and with evident success, because in the case of the wet clover, the hay cut out free from mould, the cattle did not dislike it, and improved upon their food; and in the latter case, the dampness of the salt penetrated the tender stalks and blossoms of the clover, and induced or brought on a degree of heat which contributed to the settling or fermentation of the hay, and superinduced a *gout* or flavour uncommonly agreeable to the cattle. The proportion of salt to the first was about eight pounds weight, varying according to the degree of wetness, and of the value of about 2*s.* 2*d.* per load, and to the latter about ten pounds to the load, according as the same may be more or less overmade, and of the value of about 3*s.* Thus we see, that for the very trifling expence of 2 or 3*s.* per load, it is possible to correct the misfortunes attendant upon a very wet season, and to remove the inconveniences of a gross oversight in the farmer or his people, in having neglected to attend in proper time to the well making of his hay.

Produce.—Upon good soil, and in fair condition, two loads of truss bound hay, with good feed for three months after, is about the standard. But land in high condition has been known to yield a first cut of three or more loads to the acre, 240 to 300 pounds weight of clean seed, besides the tail or offal, perhaps nearly one sixth part as much, for the second cut, and a large proportion of dry provender for young stock, equal to one load and a half to the acre.

Disposition.—In the vicinity of the London markets, almost the whole that is grown is carried there and sold publicly, but a great part is also contracted for by the brewers, distillers, starch-makers, wharfingers, coal merchants, and by all those whose occupations require a heavy large sort of draught horse, for which this hay, either consumed as such, or cut into chaff, is considered to be highly invigorating and nutritive; probably more so than any other sort of hay with which we are acquainted, if we except sainfoin, and indeed its superior price, generally averaging about 14 or 16*s.* per ton more than the best meadow, or any other sort of hay, evidently proves it.

Clover is become so universal a plant in regular cultivation in every part of this county, and indeed throughout the kingdom, and its properties are now so well understood and ascertained, that it leaves me but little to urge in its behalf. It is calculated for almost all soils and situations that are not perfect bogs. It is a good preparative for wheat, if not brought into course too quick and rapidly, of which it is very tenacious, and the better the crop of clover the better will be the crop of wheat. It is apt to fill the ground with weeds, unless great care is taken about the quality of the seed sown. It is given to horses green, of which they are very fond, and many acres are cut in that state within seven or eight miles of London, tied up into bundles and sold for that purpose. Milch cows and oxen are very fond of it in its luxuriant state, and first growth; at which period, however, there is great danger of their blowing themselves, or as it is called to become hoven, if they are left alone for any length of time, and not driven about; but especially if from the heat of the weather and the troublesomeness of flies, they are suffered to get into water and drink; in which case their destruction is almost inevitable; as I once saw in a field belonging to Mr. Ismay in the Washway, where ten or more fine Holderness cows, worth at that time upwards of £20 a piece, were the greater part lost by swelling and bursting before assistance could be given them; and indeed the whole of his stock, which might then have amounted to above 100, would have stood a chance of sharing the same fate, if the man who was appointed to look after them, but who had neglected to do it, had not very opportunely arrived. In those cases the introduction of the flexible tube into the stomach gives instantaneous relief. It is sold by M'Dougale, in Oxford-street.

It produces a great flush of milk to cows in its green state, as on the contrary it tends to dry it up, when given as hay. Sheep are also much attached to it, as well green as when made into hay, and if given to them in the latter state in the morning before they are let out of the fold to turnips or rape, it prepares and guards the stomach against the coldness, the rawness, and the crudities of them. If sheep are intended to be fatted with clover, they are turned into it about the middle or end of April, and continue there until the middle or end of June, or indeed until they are fit for the butcher. Sometimes they are fatted off with oil cake and the second growth of clover.

The following Estimate appears to be the present State of the Expences on, and Value of, one Acre of Clover. The Hay in the one instance to be sold, and in the other to be consumed.

To 14lb. of prime red clover	£0	9	4
Sowing and incidental expences	0	3	0
Mowing, making, stacking, thatching, straw, cartage, &c.	0	18	0
Dunging, or top-dressing with ashes	1	16	0
Cutting, binding, marketing, carting, &c.	0	7	6
Second Crop.			
Mowing, making, cutting, &c. as before	1	5	6
Rent 20s. Tithes, poors'-rates, &c.	1	14	0
	£6	13	4

PRODUCE AND PROFIT.

I take it, upon the average of the crops in Surrey, for the first and second cut there is not less than three loads, of 18 hundred weight each, grown, (I have been informed in several places of 4¾ loads being produced) which at a medium price for the last four years of six pounds per load, will make it stand thus:

By 3 loads of hay, at £6	£18	0	0
By 1 month's feed after the second cut	0	3	0
	18	3	0
Deduct expences	6	13	4
Balance in favour of the grower upon the sale	£11	9	8

But if fed off or consumed on the Premises.

Dr.				Cr.			
To seed as before ..	£0	9	4	By 2 loads of hay to feed......	£10	0	0
Mowing, dunging, (not marketing, &c.) ..	3	0	6	By 4 months feed	2	16	0
Rent, tithe, &c.	1	14	0				
					12	16	0
	£5	3	10	Deduct expences	5	3	10
				Balance in favour of the grower when consumed on the premises.	£7	12	2

SAINTFOIN. HEDYSARUM ONOBRYCHIS.
Diadelphia decandria. Linn. Sp. Plant.

There are 58 species of this very interesting genus described in the Systema Vegetabilium of Professor Murray, and the Supplementum Plantarum of the younger Linnæus; and among those described as having feathered leaves, (foliis pinnatis,) is the plant we are about to detail. Its characters are thus marked: "the leaves are feathered, the legumes or pods have one seed only which is prickly, the wings of the corolla are of equal length with the calyx, and the stem of the plant is elongate or drawn out."

This plant or grass is of so valuable a nature as infinitely to exceed every other that is yet known: its qualities, when made into hay, have always been held in such high estimation, that the French, to whom we are indebted for its introduction, call it by the very significant name of saintfoin, or holy hay.

It is cultivated in those parts of that country where the soil is adapted to it in great quantities, and to great perfection; notwithstanding which it appears to me that either they do not know how to make it into such good hay as we do, or else they do not think it worth their while to take so much pains about it, for the hay is very inferior to ours.

In this county a greater breadth is grown than in any other with which I am acquainted, which may be partly attributed to the great extent of chalk hills which run from Addington and Limpsfield, in the eastern, to Farnham, in the western part of it, making a distance of not less than 35 miles, and an average breadth of about six miles; and partly to the high price which the hay constantly bears above any other in the immediate neighbourhood of its growth, for the use of the numberless hunters that are kept on those hills, and the increasing demand there is always for it at the several markets in London.

It is to be understood, however, that I do not mean by pointing out this particular tract of country as the place of its growth, that the whole extent of it is exclusively employed in this species of cultivation, and to the absolute rejection of every other; because, a great part of it is in common field, and therefore, it would not be considered safe to sow such a crop; but wherever it is in a state of severalty, a great breadth is now in saintfoin.

The soil upon so extensive a line of hill is very various, from a poor thin sandy loam upon a limestone rock, to a strong argillaceous soil upon a free chalk-stone rock, or upon a free-stone, as in Godstone, Reigate, and some of the adjacent parishes, and in these gradations of soil, some abound in flints, others in a ferruginous sand-stone, others in a hard crustaceous flinty lime-stone, and some with scarce any stones at all.

The late Mr. Ashby, of Woodmanstone, was a large grower of saintfoin, and he found it so advantageous a crop as never to be without a great number of acres, and I have often heard him say that it was worth 20*s*. per ton more than the best meadow hay, and 10*s*. per ton more than any other hay that is brought to market.

It is, however, a delicate crop, it will not bear to be fed down close by sheep, as other grasses will, and especially at the first springing, as it causes it to bleed so profusely as to injure it very much; indeed, by a continuance of the practice, it may be entirely killed. It is also difficult to make it into hay sweet and good in a catching harvest, because if much rain should fall just after it is mown, it is of so succulent a nature, and so tenacious of moisture, that it becomes very difficult to prevent its turning mouldy in the stack, and being consequently spoiled. Indeed, I have seen some hundreds of acres lying in so wet a state as to be utterly irrecoverable. It is always, as I have said before, in such great demand, that no prudent man whose soil is congenial to it will be without a considerable portion of it.

PREPARATION.—As this is an abiding plant, our best farmers are very particular in the due preparation of the soil, as a point upon which the future success of the crop most materially depends. As it is usually sown with barley, it is customary to make as good a turnip season as possible, to be well and clean hoed, and afterwards folded off clean, as a necessary preparative to the subsequent operations. The turnips being fed off not later than November, the ground is immediately ploughed up and left rough: in January it is harrowed down, and being well pulverized, is immediately cross-ploughed as deep as if for a crop of carrots, provided the soil will admit of it. The first week in March it is well harrowed down, and a slight sprinkling of good rotten dung is laid over the ground, lightly ploughed in, and the land ridged up. About the middle of the month the barley is first sown thin broadcast, once harrowed, and the saintfoin being afterwards sown, the land is finished off, the seed covered with the fine harrows, and in a few days it is lightly rolled.

Other farmers at the second ploughing scarcely exceed the usual depth, and reserve the third ploughing for the period of sowing; when, having well harrowed down the ground, the seed is sown, that is, the barley, broadcast and ploughed-in, the saintfoin follows after, which is harrowed-in and rolled as before; or the ground is first ploughed, and the barley being sown broadcast, is harrowed once in a place with the large harrow, then sown with saintfoin, and finished off as before.

But each of these modes are attended with difficulties which do not strike the generality of farmers. In the first place, as this is a hill crop which must be more or less exposed, and as there is always a current of air upon those hills, a seed so large and light as this is, cannot in the nature of things be sown with evenness and regularity broadcast; nor is it possible to cover it of an equal depth with the harrow, without very much disturbing the barley; nor in fact, supposing there to be no barley or other grain sown, could it be covered of a proper depth by the harrows, because it has not weight enough to sink by the stirring of the soil; and those seeds which are not covered will sprout, probably from the moisture of the atmosphere, and become in the language of the farmer, malted, and will necessarily perish from the coldness of the air; and of those seeds which may be too deep covered, that is, much more than half an inch, the neck of the plume, which is the scaly part of the young plant which ascends, is so weak in proportion to the size of the head of the seed, that it has not strength sufficient to force its way through the incumbent mould; therefore, whether the seed be sown too deep, or not covered, or whether the seed be not all of equal quality and goodness, it often happens that many parts of the ground is greatly understocked; this was particularly the case in the spring of 1800; and I have since been able to try an experiment which fully justifies these reasons and causes of the failure in the vegetating of this crop.

I will endeavour to suggest a mode by which a good crop may be insured. First, I hold it indispensably necessary that the seed be not only all of the growth of the preceding summer unmixed with any other; but that it is so well skreened and winnowed, that all the light seeds are taken from it, whether they be blighted ones, or unripe and imperfect ones; for let it be understood, that not one seed in perhaps twenty of the very best and fullest bodied will grow if it is more than one year old, and which is easily told by its turning dark approaching to a black colour.

So much doubt and distrust have I about the vegetation of this seed, that I should be inclined upon all occasions to try the proportionate quantity of good seed in a given quantity to that of bad, by sowing a certain number in pots, in sufficient time to enable me to judge of the thickness which they ought to be sown when drilled, and the very great allowance which ought to be made when sown by themselves broadcast; and still greater when sown with a crop of corn.

Secondly, I hold it to be extreme bad policy to sow any sort of grain with it, because it stands in no need of shelter as soon as it is vegetated, of which we may be satisfied by reflecting that it is a native of the hills, and consequently is capable of supporting itself against the severities of exposure; and as it does not tiller out like corn, or most other grasses, but ramifies very much, every plant of corn that stands in the way, instead of letting it grow stocky, and consequently hardy, causes it to be drawn up and made tender; besides, should the corn lodge from any cause whatever, there is an end to the saintfoin, because in that early stage the quantity of succulent matter in the plants, and the exclusion of the air by the lodgment of the corn, would bring on, very soon, fermentation, and as speedily putrefaction.

But should the corn continue erect until harvest, the plants will, as I have said before, be very much drawn, as is frequently the case, and the only remedy that can be applied with any advantage is a good coat of dung rather long, but by no means hot; even with this protection the weaker and more tender plants will, to use the phrase, be actually spewed out of the ground, (which happened upon many farms in different parts of the county last season and this, 1804,) by alternate frosts, thaws, and cold winds, and those will consequently be killed.

Under all these circumstances, therefore, there can be no question but that it is of infinite importance to the crop of saintfoin that it should be sown by itself; and if it must be sown broadcast, the ground after being reduced to a fine state of pulverization, ought to be rolled down smooth, the seed to be then sown as equally and evenly as possible, and harrowed-in with light harrows, running the barley-roll over as a finish.

SEED.—Four bushels to the acre, broadcast, is the usual quantity sown in this county, and where the drill is practised, which happens but in very few places, two bushels are found to be sufficient; even this quantity, supposing only two-thirds to grow, must be infinitely too much, and upon the same principle supposing the like quantity or number of seeds to grow, how greatly overstocked must such land be that is sown with four bushels.

And in order to satisfy myself that it was so, from one quart Winchester measure I counted the seeds, which were of the usual quality, rather of the best than otherwise, and I found that at the rate of four bushels to the acre it would afford me no less than 3,484,800 plants, which is equal to 21,760 plants to the square pole, or 80 plants to every square foot. If this be the case it is next to impossible that any land can sustain such an overcharge, and therefore it would appear that this usual allowance is infinitely too great. Yet, considering that it may be deemed rather a precarious seed even when new; and when bought of the dealers and jobbers, that uncertainty is more than trebled; considering also how many of these perish in vegetating, how many plants are killed off by being smothered by the corn, and how many die the first winter, perhaps eventually there is not one seed too many sown to cover the ground as it should be with a sufficient stock of plants.

But does not this very circumstance prove to a demonstration, that if the quality of the seed was first proved, and that seed properly sown, perhaps half a bushel, or at most three pecks of seed, would be *quite* sufficient to ensure a very capital and ample stock, far superior to any thing we can see in the common way, and we should at the same time be putting just all the difference in the prime cost of the two quantities in our pockets? Seventy-two heads have been known to proceed from one root; and the crop evenly and thinly sown, will average ten heads.

STEEPING the seeds of this plant is never practised, indeed it would be a very dangerous experiment; because, if the seed is all new, and the weather holds dry, it will very quickly vegetate, and therefore does not require any steep; but should the weather prove wet, or even moderately so, with cold sharp winds, it is probable that every seed would rot or perish, either in the ground, or as soon as it began to break ground, even with the very best steep into which it could be put.

SEED TIME.—Many experiments have been tried by respectable farmers in this county in order to discover and ascertain the best time to sow this seed. It has been tried in March, April, May, August, September, and October, for successive years; and a very decided preference is given to the month of March; and probably with very substantial reasons, because so long as it is sown among spring corn, there is no other time at which it could be sown, and no man would venture to sow it early in the autumn, or among wheat, because the latter is so dependent a crop, that few men like to sow it so thin as to have, perhaps, not half a crop; and if it were thicker the saintfoin would be inevitably spoilt.

Admitting, however, that this seed was sown by itself, it seems probable that March would be the most proper season, or at latest during the early part of April to sow it, because, from some small experiments that have been made, the vegetative powers of this seed pass off very quick, and in course it increases the hazard very considerably by deferring it to the more warm and dry months, especially when we reflect upon what I have said about the usual mode of sowing, and the difficulty that attends the proper covering the seed. Besides, as this plant is among the tap-rooted ones, searching downwards for its food, and not horizontally and along the surface as other grasses do, if it were sown in the autumn, it would scarcely have time to get sufficient hold of the ground to secure it against being thrown out by the inclemency of a very frosty winter. Again, the natural succulency of the plant bespeaks it rather a spring than an autumnal one, because when sown at the latter period, it would not have its regular period of decay, but on the contrary, may be said to be killed off by the natural severity of the winter, which would not fail to weaken and injure the root. The tempus serendi, (as Virgil calls it) or period of sowing, is therefore very properly confined to the spring.

Cultivation.—It will follow from what I have before stated, that being sown among barley it can receive but little assistance from cultivation the first season; whatever treatment that experiences as to destroying of weeds operates to the advantage of the sainfoin also; but I do not find that any greater expence is incurred because of this crop, which for one whose duration is of such long continuance, is so far as I have been able to see, a mistake, since it is not unusual to see some lands that are prone to thistles and coltsfoot, abounding therewith. This, however, applies only to the general cultivation, because there are such men as Mr. Fletcher, Mr. Lucas, Mr. Saunders, and some others, who think no pains too great to make the crop clean in the first instance, and to keep it free from every thing that may tend to injure it, as well as in the highest condition until its final peroration.

In my account of gypsum in the chapter on Manures, it will be seen that Mr. Saunders pays very particular attention to this most essential subject of cultivation; whenever he sees the crop to have suffered from the drought of a preceding summer, or the severities of a long winter, and to become thin thereby, he loses no time in repairing in some degree the loss, by encouraging the growth of the remainder, and he finds nothing to answer his purpose so well as gypsum applied in February, after the rate of five bushels to the acre, and not more, because he has found that then it will do more harm than good; and it will be seen by referring to the before-mentioned account, that after such an application or dressing, it increases the usual produce to nearly one load to the acre. There are some other particulars relative to this plant and this manure, which, to save repetition, may be referred to also. Mr. Fletcher, and most other farmers manure with yard dung, which, as far as it goes, is, no doubt, of essential service; but as most dung generates weeds, more especially when it has rather become rotten by soddening and treading in the yard, than by having passed through a regular fermentation, it cannot, therefore, be so proper a manure as a top-dressing of soot, bone ashes, gypsum, &c.

If the soil is naturally poor it is absolutely necessary that the crop should have a dressing of some sort or other the third year, and I find that it is customary in every such instance, to lay on from 30 to 50 loads of such manure or mixen as may be most ready and handy. If the plant does not wear out very fast, about the sixth year it has another dressing after the same rate, and when the effect of that is gone, it is a question with many sensible farmers, whether it will pay for a third dressing, and therefore it is suffered to take its chance by feeding it with sheep, preparatory to its being broke up for a crop of peas, or as sometimes happens, for a crop of wheat.

But on soils which are of good quality, and where the plant may be said to be indigenous, it is of such long duration, and loses so little of its vis inertiæ, as to be considered only in its prime at 20 years growth, and will continue bearing good crops for 10 years more, and I have been assured much longer if it is assisted occasionally with the vivifying stimulus of the dung mixen; but all stimulating manures, that are usually stiled top-dressings, produce, as it would seem, such an exertion on the part of the plant, and, during the continuance of its influence, such a redundancy of crop, as cannot fail to wear it out before its time.

Harvesting.—As soon as the general appearance of the field indicates that the crop is in full blossom, it is mowed down with cradled scythes, and remains in the state in which it falls in swaths until it is about two-thirds dried through. It is then carefully turned over with rakes or large wooden forks, as soon as the dew is off the ground. And if the weather be favourable, the sun powerful, and the wind tolerably brisk, it will be fit to cock the next morning, and may be carried in the course of that day.

In cocking, and in moving it about by loading and unloading, too much care cannot be taken in shaking it as little as possible, the better to secure the leaves which rub off then with great facility. Nor can too much expedition be used in getting it into the stack, for fear of thunder showers, and an alteration in the weather, which could not fail to injure it; indeed, a large sail cloth or two to be ready in case of emergency, or to be put over the rick at night is a sort of almost necessary appendage to the due securing not only this, but other valuable crops at the critical time of harvest. It must be thatched as soon as the stack is finished. That which is put up quite dry will come out of the rick of a bright green colour; that which has much heated will look brown. After the crop is carried, it is not advisable to turn in sheep or neat cattle for at least 15 days, in order to give it time to recover itself; but if they are kept out longer, there will be more feed, and the plant in better condition to bear the cropping.

PRODUCE varies much, both as it regards the quality and the artificial richness of the soil, as well as it regards the dryness or the moistness of the season. Every thing being favourable, and the ground well planted, three tons per acre is no unusual quantity; two and a half very common, and seldom indeed less than two tons for a crop. There is then all the after-pasture for feed, which is very considerable (for it is but seldom mowed a second time unless for seed;) and at that time of the year upon the hills, when every sort of grass runs short, it becomes very valuable.

I look upon an acre of sainfoin in fair condition, to average to the grower, at least £17; where it is cultivated in great perfection, I am assured that the whole crop, and that nearly 30 acres, has produced full £20 per acre, for four or five years successively.

There are some farmers who make a regular practice of saving the seed for sale, and it requires no little attention and experience to know at what degree of ripeness it is best to cut the sainfoin that has thus stood for seed, because they do not all ripen at one and the same time. The center ears blossom before the lateral ones, and every one begins blossoming, like the bean, at its lower part, and continues blossoming gradually upwards for several days; by which means, the pods are formed and almost filled at bottom, before the flower is gone off at top. If the cutting be therefore deferred until the top seeds are quite ripe, the bottom ones, which are the plumpest and best, would shed and be lost. The best time, therefore, to cut it, is, when the greatest part of the seed is well filled, that which blossomed first is ripe, and the last blown beginning to be full, for then the latter will ripen after cutting, and be nearly as good as those which were ripe first. For want of these precautions I have seen much of the best seed lost.

To those who are unacquainted with saving the seed, it becomes necessary to caution them against mowing it during the heat of the day; especially if the sun shines out, because it is impossible to do it so gently, as to prevent even some of the unripe seed from shedding. Our Surrey farmers, therefore, prefer the morning and evening for this work, and while the dews are on the plant, rendering it thereby more retentive of its seed.

Supposing the weather to be fine and clear, and the crop not over thick, the sainfoin will dry sufficiently in the swaths without turning; if the weather proves wet, and there is a necessity for turning them, it should be done with great caution while they are yet moist. In turning them, I observe that they always apply the fork or the handle of the rake to the upper side of the plant, letting the root part fall over last, in order to prevent the violence of the fall from shaking out the seed.

When it is fit to be carried, it should be put into a barn, because the seed will keep better in the pod than when thrashed out, and as it is not wanted before the spring, it can then be got out, and will be of a bright colour, but care must even then be observed, not to lay it in large heaps, for it is very apt to heat, which would soon bring on such a degree of fermentation, as would infallibly injure, if not destroy its vegetative powers. It is not unusual for it to heat in the sack, when too soon put up, the middle will turn black and mouldy, while that at the top of the sack may preserve its colour. It is in perfection when the husk is of a bright and rather light brown, the kernel full and plump, and of a light grey colour, which upon being cut asunder diagonally, appears green, and fresh, and free from any sour smell. Any other appearances than these are certain criterions of defect somewhere, and should be noticed with great caution.

The quantity of marketable seed produced from an acre, is about 32 to 36 bushels, and of tail two to four bushels; the former of the value this season, 1804, from 50*s.* to 60*s.* per quarter, and the last season from 65*s.* to 70*s*, per quarter. The value of the tail must depend upon its quality, but in general, if the farmer does not sow it, he gives it to his horses, instead of oats. Mr. Saunders cleans it as well as he can, and sows it with clover, to stand for one or two years, according as it may be more or less good.

CONSUMPTION.—The manner in which this plant is disposed of is as rack meat, for hunters, racers, and the superior class of carriage or saddle horses; it is very seldom cut into chaff, and still less seldom given to sheep or cattle, owing, as I understand, to the great price it bears for the former; but as it is found so highly nutritive for them, being more viscous and less flatulent than clover, it is fair to suppose that it would prove equally profitable when given to cattle. Indeed, I have seen at the late Mr. Ashby's, sheep, cattle, and horses, get as fat as pigs upon sainfoin hay, which he deemed not saleable, because it had been a little discoloured by a wet harvest. They were racked down with it, in a well littered and sheltered straw yard; indeed, I could not but remark, that their coats were always more elastic and smooth than those in the neighbouring yards, where they were fed upon damaged clover, hay, haulm, or straw; and but little inferior to those kept in the stable.

Horses are uncommonly fond of the seed, and Mr. Fletcher assures me, that it is with great difficulty he can keep his carters and their boys from taking it away whenever they can find an opportunity for so doing, in order to give it to their horses to make them fat, and their coats sleek and fine; it is a more hearty food than oats, and better relished by horses; but it is always too dear to make a practice of feeding them with the seed.

The great advantage accruing to the public from the cultivation of this plant, arises from these circumstances, first, that it will flourish upon soils where most other plants would starve, producing according to the old remark, above 40 times more herbage on the poorer soils than common turf: but this remark can only apply to the first time of its being sown on those soils, because, I am assured on the authority of Mr. Fletcher, that in thin land like some of his, it will not thrive, if it has had a crop of sainfoin within the space of ten years; indeed he seems to be of opinion, that few or no soils, however naturally good, will bear this crop a second time within that period, unless the same has been made very rich by manuring, and clean by good cultivation. This curious fact he has found to be the case from repeated experiments and trials.

Secondly. It is a perennial plant, abiding for many years in the ground with renovation; and requiring no other assistance, than what is usually given to pastures that are regularly mown, and by being infinitely more productive, is of course so much the more valuable.

Thirdly. By being furnished with tap roots whose nature it is to go downward, they seem to draw less of their nourishment from the atmosphere than most other plants; indeed, their penetrating so deep into the earth, which can only be for the purpose of seeking for that pabulum which no doubt is congenial to them, almost confirms the idea. Every writer upon this plant, from Pliny to the present day, has uniformly taken notice of the extraordinary length of these roots, but there was a remarkable confirmation of this fact, in making the new turnpike road from Croydon to Godstone, about six years since; for in cutting through some fields of sainfoin, roots of this plant were followed to a depth so extraordinary, as to make the bare mention of it appear so marvellous as almost to exceed credibility. By supplying themselves in this manner, no doubt I think, with their proper aliment, they are enabled not only to resist a very considerable degree of drought, but are capable of producing very exuberant crops, when others are parched and burnt up.

There is another circumstance relative to the immense value of this plant, which deserves to be recorded in this report. I do not pledge myself for the accuracy of the particulars, but in the amount of them I am so far correct, that I noted down the substance, very shortly after I had been made acquainted with it by G. Holmes Sumner, Esq. of Hatchlands in this county, one of the members of the Board of Agriculture, and a near neighbour of the gentleman to whom I am going to refer. I was anxious to be furnished with more information, and to put all doubt out of the question. I therefore took the same liberty with him that I did with other gentlemen in the county; and, after representing the nature of my employment, I availed myself of that opportunity to submit to him the same queries I had done to other gentlemen; and in particular, was desirous of obtaining more general information as to this individual circumstance. As there was no secrecy in the matter, I presumed there was nothing indecorous in the request. But from that day to the present, now above a year and half, I have never received any answer either to my queries or to the point in question. I took it for granted, that he had his reasons, and therefore I troubled him no further; concluding, as I thought he might probably, in the language of Ovid, "Grati erat instar amoris." It was a kind of favour he was not obliged to grant, nor as little to assign any reason.

The gentleman I am alluding to, William Currie, Esq. of East Horsley, near Guildford, and member for Winchelsea in the late parliament, some time since purchased a tolerably sized farm in that neighbourhood, which having been for some time neglected, worn out, and otherwise in bad plight, as soon as he got it into his possession he cleansed it pretty effectually, and then laid a principal part of it down with sainfoin. The first crop he obtained from this plant was so large as actually to pay for the fee simple of the estate.

What other crop would have done the same under similar circumstances.

Since writing the preceding account, I have been over Mr. Smiths' farm at Wilderwick; he has this spring sown a field of wheat with sainfoin, harrowed in; the wheat was purposely sown somewhat thinner than usual, on account of this crop, and from the coldness and variableness of the spring, much of that wheat had in patches died off. The sainfoin had in general planted well, but it afforded me much gratification in being able to convince, by ocular demonstration, so able and so indefatigable a farmer, of the great impropriety in sowing corn with either this crop or lucern; nothing could be more opportune, for here it was evident, that in every direction in which we crossed the field for this express purpose, wherever the corn stood thick, (and had this been the only crop he would have deplored such a thickness,) the sainfoin was thin, weak, and drawn up; wherever the corn was thinner, the plants of sainfoin were proportionably stronger and more numerous, and where there was no corn at all, the young plants were in as high a state of luxuriance as could be wished. With such a proof as this he could not but be sensible of his error, and as none but ignorant and weak men are obstinate, he immediately expressed his conviction, and determined to sow no more seeds along with corn in future. He was now sensible also, that the cause of the great failure of his lucern, and the unexampled manner in which it was drawn out of the ground, proceeded entirely from its having been sown with oats, which proving more abundant than was expected, had prevented the plants from striking downwards, much of the root being above ground, and consequently it became an easy matter for the violence of the frost to root them out altogether; for at least three fourths of them were found upon the going away of the last frost, entirely ejected, and the much greater part of those which were left were more or less drawn out, and occasioned a very great deficiency in the crop.

I leave it to sensible men to account for so extraordinary a blind-folded partiality to systems, which every day's experience convinces us are futile and absurd.

Seed is often saved the first year by many farmers, and some there are who let their plants run to seed, which are suffered to shed in order to thicken the crop, but it very seldom answers the purpose, for the old plants being stronger than the young ones, they ramify so much as to draw the young ones up very weak and spindling, which they seldom recover.

The following calculation clearly shews that it is more profitable to sow Sainfoin without Corn than with, and especially if it be considered that no Farmer sows a full Crop of Corn when he sows at the same time any other sort of Seeds.

With Corn	*Dr.*	*With Corn*	*Cr.*
To barley 4 bushels to the acre at 4*s*. 6*d*.........	£0 18 0	Produce by 4 qrs. barley 1st year....	£7 4 0
To Sainfoin five bushels to the acre at 8*s*..........	2 0 0	By 1 load sainfoin hay 2d year...	5 0 0
	2 18 0		12 4 0
		Deduct expences..	2 18 0
			£9 6 0

Without Corn.	*Dr.*	*Without Corn.*	*Cr.*
To sainfoin 3 bushels to the acre, at 8*s*. 6*d*.........	£1 4 0	Produce by 1 load of hay 1st year....	£5 0 0
		By 2 loads of hay 2d year....	10 0 0
			15 0 0
		Deduct expences....	1 4 0
			13 16 0
		Value of the crop with corn	9 6 0
		Balance in favour of crop without corn	£4 10 0

BIBLIOTHECA BODLEIANA

When the crop of barley throughout the kingdom averages five quarters to the acre, it is seldom that it sells at market for more than from 24 to 28*s*.

per quarter, I have therefore taken it at 26*s.* as a medium price, because when it sells for 30 to 36*s.* it is seldom that the crop will average four quarters, and four quarters under all the circumstances of this crop, is as much as I have found the county will average; but even if it were five or six quarters, the advantage is still in favour of sowing sainfoin without corn.

There is yet another incident no less material, and which I ought to have taken into the account, but which I forbear, because I would not be supposed to strain the point in favour of my own doctrine. It is but right, nevertheless, that it should be stated.

When barley or oats are sown with a crop of sainfoin, and as either of these two are considered the crop in that instance, they stand until they are ripe, a great deal of the seed of either of them will be ripe and shed before they are mowed, some will shed in mowing and harvesting, and many of these being the most prime of the crop will vegetate the ensuing spring, and grow with the crop of sainfoin, especially if that be thin. Thus when the sainfoin is cut and made into hay, of course the corn makes a part of it. If this hay is sold, it will not fetch so much at market by 20*s.* a load, as five pounds would be its value, when the pure sainfoin will sell for £6. The truth of this any hay salesman will aver. If, however, this hay is consumed at home, its nutritive properties being virtually less, its intrinsic value must also bear the same proportion; and consequently, in whatever point of view this argument is held, it seems clear that the advantage is greatest when sainfoin is sown without corn.

LUCERN. MEDICAGO SATIVA.

Diadelphia decandria. Linn. Sp. Plant.

Of this genus there are nine species, and about 15 distinct varieties, described in the latter works of Linnæus, one of which species is the plant above-mentioned, where it is characterised under the name of the cultivated medick or lucern.

It is grown in many parts of this county in quantities of one, two, or three acres in gardenlike culture, but Mr. Wm. Adam, of Mount Nod farm, and Mr. Smith, of Wilderwick, are large growers of it, the larger in drills, the latter broad cast.

It is a plant of the leguminous kind, with purple or violet coloured blossoms, the pod contorted or twisted, and the seeds kidney shaped. It delights in a rich, light, deep, soil, although it grows well in a strong one, as at Mount Nod, and at Apsleys Green; and in a calcareous shallow soil, and exposed situation as at Sutton, near Seaford, in Sussex; but nevertheless, it does not love clay, nor does it thrive so well upon dry parching soils. It is easily choaked up by weeds, or other plants, and therefore should always be sown by itself, and in land that has been previously well cleaned, deep ploughed, brought into a fine tilth by repeated ploughings, harrowing, &c. and into a high state of cultivation by tares, and turnips fed off, but by no means dunged for the crop.

Having sold a great deal of this seed in the early part of my life, and particularly to my friend Mr. Launcelot Harrison, of Sutton, who I believe was the largest grower in England, and who to the best of my recollection seldom had less than 30 or 40 or more acres; and having often heard him speak of the immense crops, and the great value of those which he had frequently met with in Normandy; I was extremely anxious in my excursion through that province in the summer of 1802 to view with particular attention their mode of cultivating this plant, and to make myself acquainted with every thing that related to the consumption of it; but the uncommon and almost unexampled drought of that season, had so powerfully operated on their pastures as well as on this plant, that not a blade of the former was to be seen, and but little of the latter in any state of luxuriance, either in Picardy Champagne, Artois, or Normandy; and the best was in the neighbourhood of Rouen and Troyes; (I make use of the ancient names of the several provinces, as being more generally comprehended than as they now are by departments.) Some of the lucern was more like the straw of barley, and oats, in height and thickness of stem, and appeared equally dry, with nothing of smell, and but very little taste, yet they assured me it was prime hay, and upon which their cattle throve well.

Almost all the hay which came to Paris was in the same state, and I found from several of the members of the national institute, that it was considered the better hay when it was thoroughly made in the field, and was got into the barn or shed quite dry, and did not heat; indeed, if it had been otherwise, the heat which any large body of it would engender, must frequently endanger the buildings by fire; but that scarcely ever happens, for by leaving the hay in the fields for some time in large cocks, the little heat which might arise in such a body, perhaps less than half a load, would be quickly carried off when it came into contact with the cold air of the atmosphere, which surrounding these cocks and penetrating them on all sides, as far as the looseness of the hay would permit, would necessarily prevent but a very small portion of the hay from heating at all if it were so inclined. They seldom or never stack their hay in ricks as we do; for, if they did, the heat of the climate and being exposed to drying winds could not fail of increasing the harshness of the already overmade hay. At first, our English horses did not at all relish it, but the want of better made them eat it, and the several grooms I conversed with, assured me, that they very much improved upon it with very little corn in addition. In the interior of France the cattle must absolutely have perished or been fed with corn, if it had not been for this hay, and many hundred sheep, oxen, and cows were killed because their owners could not find provision for them. It is considered the most heartening and enriching food they can give to dairy cows, and ewes with lamb, being more substantial and less watery and scouring than either turnips, tares, or cabbages. They are fed with it in its green state cut fresh twice a day; and when made into hay, and intended to fat stock with, if a small quantity of salt is added to it as it is put into the barn, it gives a relish to it which the cattle very much like, which makes them fatten more kindly; and I was assured by a very respectable farmer, that the meat received a flavour from this feeding, very different and very far surpassing the ordinary fatted meat. This gentleman farmed in the neighbourhood of Vernon, and appeared to be thoroughly acquainted with the modern system of farming, as practised in the low countries, as well as in England, had travelled much, had read a great deal, and his library was well stocked with the various publications on husbandry, botany, and chemistry, which he knew how to apply with great skill to the different purposes of agriculture. To him I am indebted for what little knowledge I have in the practical part of chemistry, especially that part which could be of use to a farmer. But to return from this digression, he uniformly drilled his lucern at 12, 15, and 18 inches asunder, a certain portion of ground at each of these distances, and his reason for doing this was, because he found if the season proved a very moist one, that which was sown thick, viz. at 12 inches, occasioned the plants to run up weak and spindling, and to die away at bottom for want of air, and in those seasons the wider the rows the better and stronger the crop; in a very dry season like that of 1802, the closer the rows the more moist the intervals were kept by the shade from the plants, and this crop at the time I saw it was infinitely the best, and being all in one field apparently of the same quality, and with the same treatment as to cultivation, his reasoning appeared to me to be judicious. He had a few acres broadcast, but as from the nature of this mode of cultivation, he never could hoe it to keep it clean, nor by opening the surface and pulverizing it, admit the sun and air, or in case of an apparent dry time could he land or earth it up, so he invariably found the broadcast deficient in product, wearing out much faster, and what appeared to distress him more, it was every year getting fouler in the same proportion as the crop was wearing out, and against this there was no remedy. Lucern thus sown seldom lasted more than seven or eight years, it was then five years old, and several large patches were quite bare, whereas the drilled was then 13 years old, and appeared in its prime. Thus a powerful argument is evinced in favour of the drill.

Preparation.—After what I have already said it would be unnecessary for me to repeat the same, did I not think that by omitting to detail Mr. Smith's superior treatment of the subject, I should be doing him an injustice. After breaking up the soil with a strong turnwrest plough in the autumn, he gives the land a complete summer fallow; during which time it is rolled, harrowed, cross ploughed deeper and deeper, for three, four, or five times; during which operations, he is preparing his head lands entirely round the field, by taking them up as deep as there is any soil, upon which he draws his dung and lime; the quantity of stuff thus prepared is incalculable. Having by an early period in the autumn, finely pulverized and mixed his soil, he sows it with clean winter tares, which he folds off as early as there is feed for his sheep, (which are of the Romney breed) he immediately shallow ploughs up that part which is fed, to prevent the extraction of the carbonic acid from the dung, and after suffering it to lay a little while, he harrows that down with his ox harrows, and then rolls it until the clods are either broken in pieces or forced into the ground, the surface therefore becomes smooth; he immediately claps in the turnwrest, and cross ploughs as deep as the land will permit, and to a full depth of 14 or 16 inches; and before it gets dry by the evaporation of its moisture, he harrows it down, first with the large and then with the small harrows, rolling between whiles if necessary; his object being by this operation to reduce the soil to as fine a state, and to mix it as much as possible. Early in June he draws on this mixen after the rate of 80 to 120 cart loads, (being always guided by its quality, and to the due turning, weeding and compounding of which he pays unremitted attention,) spreads it immediately, and with a light snap plough follows close upon the heels of the spreader, ploughing shallow, landing up, and sowing white round turnip for a full crop, which is lightly harrowed in, and finished off with the barley roller. If these turnips take well, they are twice hand hoed, and the roots set out as regular as possible; if the crop is thin they want hoeing the oftener, because where no roots are there will spring up weeds, and he is as great an enemy to them as any man existing; he therefore thinks no pains too great, nor any expence thrown away, that tends to make his land clean. As soon as the turnips are fit to feed off, he folds his sheep on them, and feeds them as soon and as close as possible, follows after with the turnwrest plough, shallow turning the furrow upside down, and leaving it rough. As soon after Christmas as he can, he harrows it about, rolling when necessary, and crossing it with a deeper ploughing, and thus he leaves it for the first week in March, when having reduced it to as fine a tilth as possible by the harrows and roller, he lands it up in about four bout lands, (but in future he intends to increase the size to eight or more, being convinced that if the land is made properly dry by under drains, if necessary, the larger the lands, and the more even the surface, the better it is for the crop,) sows a light crop of oats, which are once harrowed in, then rolls to smooth the surface, and sows his lucern upon that, with as even a hand as may be; lightly harrows it in, and in a few days runs the barley-roller over it. In the whole of this process I see but one objection strongly, which is, the sowing it with oats; and convinced as I was of the impropriety of it, yet this conviction was still more confirmed last winter by a field of three acres, which last autumn appeared to be well planted, but was, during the winter, so drawn out of the ground, that early in the spring, when I saw it again, more than two-thirds of the crop appeared to be destroyed; and he now finds it necessary to break up with an intent of going through the same process as he did in the former case, but with the exception of sowing it among corn.

Thus far Mr. Smith's preparation is correctly given; but his neighbour Mr. Bostock, who has sown a field at his recommendation, has not followed the same process, because the field was, before, a hop-garden which he had grubbed up. The land having been kept in high cultivation required nothing but a good ploughing and harrowing to prepare it for the seed; and instead of sowing it broadcast, he has put it in drills, a part at six inches row from row, a part at nine, and a part at twelve inches; it has planted well, but it is sown too thick in the rows, which will hereafter injure the crop, and he finds the narrow rows to be already too close together, to admit of its being properly hoed.

Sort.—There is but one sort sold in the shops, and that goes by the name of the French Lucern; but I found a very strong variety in the vicinity of Rouen, the leaves and flowers being larger, and the latter also deeper coloured, and the stalk, instead of being smooth as in the common sort, was covered with a fine soft down or pile. They distinguished this by the name of the Major or Burgundy lucern, and it was evidently the best.

Steeping is never used, but as the seed often comes to England in a very questionable shape, as to age and condition, I would always recommend it to be tried, as I have directed for almost every thing else. If it does not vegetate quickly, I see no difficulty or objection to steeping the seed in milk and water made something more than blood warm for about six hours.

The seed is covered with a hard compact coat, and if dry weather sets in after it is sown, and especially if late in the season, it is often very long before it vegetates; I have known it lay in the ground from spring until the autumn, and for four or five months, and then come up very regular.

Seed.—The usual quantity sown broadcast, is from 14 to 18 pounds weight, but less than half that quantity is enough when sown in drills.

Seed time.—The month of March is the customary period, although some sow in April, when it is sown among barley.

CULTIVATION.—Particular care is taken to keep the plants free from weeds of every sort during their growth, especially root weeds, which by interweaving among the roots of the lucern, do it infinite mischief, especially the first year. If the corn is found to grow rank, and likely to injure the lucern, it must be immediately mown down, and carried off, since it is much the wiser way to lose the crop of corn than to hazard the crop of lucern; on which account I cannot again refrain from saying, that I would always prefer sowing it by itself.

After the first year, if any vacant places are found proceeding from any cause whatever, first dig up and loosen the ground a good depth, transplant from among the thickest parts, as many plants as will make good the crop, and repeat this as often as may be necessary; the better to enable the grower to do this with great facility without having recourse to the thinning out the main crop, I would advise a small nursery to be made, where the seed being sown very thin, the plants would become very strong and stocky, and being kept clean, would always be in a fit condition for transplanting and removal.

The best time to transplant them is in the autumn after the ground has been properly soaked with rain. They may be removed with great safety three years old, and even in the spring, if proper attention is paid to them afterwards, or if it be done in a wet time; and when they are removed older, it is only necessary to increase the care, supplying them occasionally with water, until the roots have struck, and have got firm hold of the ground.

At the third year, the field should have a tolerable sprinkling, according to the then state of it, of good rotten dung, laid on in the autumn, and if during a moist time, the nitrous particles of it will be quickly conveyed into the ground, and the plants will very soon shew the effects of it by their verdure and wholesome appearance.

In order that it may continue prolific, it is highly necessary to abstain from depasturing it with sheep or cattle, until it begins to wear out, when by keeping it well fed down with sheep, as the plant wears out, I have seen as fine a swath of natural grasses (consisting almost entirely of poas, trifoliums, and anthoxanthums) succeed, as ever was beheld.

Harvesting.—As soon as the crop is fairly in blossom it is mowed with a common scythe, and left in the state in which it falls for at least three days if the weather is favourable, by which time it will be about two-thirds dried through. It is to be observed that the juice of this plant is more viscous than that of any other grass, and as such, is more difficult to dry properly; and should rain fall after it is mowed, it hurts it very much, to such an extent indeed, that the leaves will lose all their blooming verdure, and turn in a very few days as white as paper.

Should the weather prove dry after a few showers, it is best not to shake it up or turn it over, but to let the sun's heat, or the wind, effectually penetrate it, by which some of the outsides only of the swaths will be damaged. It may then be turned, and the next day as soon as the dew is off, it may be cocked and carried before it is too dry, or else the leaves will drop off, and a great loss of fodder be sustained; and besides, as the stalks of this plant are more woody than other grasses, if they are suffered to get too dry, they are less likely to generate heat in the stack, and consequently will not settle down close, but on the contrary will, for want of that compression, be apt to become more and more dry.

I have seen the hay carried while it is yet in a very green state, upon the prospect of a very wet time, in that case it is customary to lay it in beds of straw either barley or oats of the best and sweetest, and perfectly dry; these beds should be alternate, those of straw being thin in proportion to those of lucern, and by absorbing the superabundant moisture of the latter, the danger of firing is avoided as well as that of becoming mouldy, and it contracts a flavour or scent which makes it much relished by cattle of all sorts, especially horses when racked with it in the winter, in the straw yard, or the stable, or when cut into chaff. Some farmers, however, condemn this mode, while others are as lavish in its praise, laudatur ab his, culpatur ab illis. Some inferring, that without great care, too much straw may be added which will spoil the hay, or too little may be put, and then the stack will fire; those, therefore, think that it is best when due caution and exertion has been used to get it into large cocks upon the approach of bad weather, by which means only a small portion of it will be injured, unless a long continuance of wet should set in; it should be thatched directly.

After the first cutting for hay, it is suffered to grow for green meat, it shoots up almost immediately, and with great rapidity if the land is in good heart, and then it will bear cutting two or three times. I have often cut it four times, and I am assured upon the authority of a gentleman who has been and is a great grower, that in a moist warm season and situation, he has cut it six times, and each cutting was a very good and fair crop; the land, however, was well adapted to it, and the plants three years old, and just beginning to be in their prime.

It is but seldom that it is suffered to be left standing for a crop beyond eight years, because, unless great pains are taken to keep it clear from weeds, they will by degrees completely choak the plants, and render the crop defective and unproductive. Besides, as the ground will have had good rest as it is termed, it will bear several heavy crops of corn at the first breaking up, without any additional manure, if a proper rotation of crops is pursued.

Some farmers, and I believe Mr. Adam is a principal, do not make it into hay at all, but keep it altogether for green meat for their cows and oxen, horses, and sheep, by which means they are carried through a very trying season with great facility.

If it is meant to save the seed, the first crop is mowed before it comes into blossom, and the second is the one from which the seed is to be saved, but it is by no means to be recommended to save any from plants under the age of three or four years growth. As soon as the pods are ripe, which is easily known by their elasticity, as they will fly open upon being handled, the heads of the plants, where the pods are situated, are cut off with a sharp sickle, very carefully placed upon cloths, and spread out upon them in the sun; the proper time to cut the seed is early in the morning or late in the evening, when the dew is on the plants. After the pods have been properly and uniformly exposed to the sun and dried, they are put into sacks or bags and well thrashed, and afterwards passed through various sized sieves; and lastly, either let up to a strong current of wind to blow away the chaff, or else put into a winnowing machine and fanned; the seed is then laid out clean for a day or two in the sun to harden before it is bagged.

That part of the plant which is left is afterwards mowed, and it serves as ordinary fodder for the cattle.

The price of lucern seed is less variable than that of any other grass seed. It is seldom sold in London under nine-pence a pound, and very rarely above one shilling even during the war.

DISEASES.—After a long continuance of hot sultry, or close muggy weather, lucern is apt to be attacked by the mildew, which soon changes the plant, both leaves and stalk, from a light lucid green, to an almost dingy white; the plant becomes very sickly, and it thrives no more. It is better then to cut it all off, and make it into fodder, when the roots, if in tolerable condition, will send forth fresh shoots, which will be free from the mildew. If this method is not adopted, I have seen the plants wither, and a serious injury has been done to the future crop.

Among the CASUALTIES may undoubtedly be

reckoned caterpillars, which in a very dry time are found to attack this plant in swarms; they begin first with the head and tender shoots of the plants, and then proceed downwards, until not a leaf is to be found; and should the weather not set in wet, which would necessarily drive them away, they naturally quit their station in search of fresh food. In the mean time, the plant being deprived of its leaves, and the sources of its existence, turns yellow, and would immediately die away if it was not cut down; in moist weather the shoots will break out again, but as the juices have been stagnated, the stem becomes hard and wiry, and by no means palatable to cattle, and therefore the most prudent way is to cut it down, and give it to the cattle in the straw yard, either in its green state, or made into something like hay, and reserved for winter feed.

The DRILL management of this plant is very different from the broadcast, and as it approaches so much nearer the garden culture, it is not only much easier kept clean and neat, but is also infinitely more productive in consequence thereof.

The preparation which the soil undergoes is similar to that which is made for the broadcast, in fact it cannot be made too fine for either, but the latter absolutely demands that it should be well pulverized; when that is done it is lightly rolled, and the seed either drilled by a machine or with a six-inch garden hoe and line, and the drill drawn flat, the seed sowed by hand very thin and regular, lightly covered over and finished off with the fine garden harrow or the rake.

The distance between the rows is very various, from six inches to two feet six inches in all the different gradations; if it is intended to be horse-hoed, it is sown wide; if to be hand-hoed, the narrow distances are preferred, and I think the general opinion seems to be from 12 to 18 inches asunder.

TREATMENT AND CULTIVATION.—When the plants are come up, care must be taken to keep them clean, and the intervals hand-hoed the first season, either with the Dutch hoe, or the common garden hoe, and even where the horse-hoe is used, it is thought to be the better plan to make use of those in preference to the larger instrument. It is generally cut once and sometimes twice, if it has planted strong, but the former is ample.

When the autumn is arrived, and there have been some soaking rains, all the superabundant plants, such for example as may stand too thick in the rows, are carefully taken up, and wherever there may be a deficiency of plants, these are cautiously put in by first digging up the soil, and making it as fine as possible to fall in among the roots, the spade, therefore, is the only instrument that can do this operation properly; and if a little water is directly poured over them, the soil will be washed in about the roots, and the plants be firmly established.

It is customary also to give the plants a fair sprinkling of rotten dung, the quantity being governed by the state of the soil and the plants. It is laid all over the ground, the dung is then carefully pointed in with the spade between the rows, without disturbing or injuring the roots of the lucern. Any gardener or handy man with the spade, knows how and can do this with great facility, and the extra expence attending this, compared with the plough, will be amply repaid by the greater regularity with which the work will be performed.

The ground being thus more uniformly dug and loosened, the plants have more freedom to extend their roots, and the dung is more regularly disposed of, than it can be by the plough. Every time the plants are cut, it is strongly recommended to loosen the ground either with the horse-hoe, or the turnwrest plough, the rest or mould-board being removed, and instead thereof to fix one in the shape of an edging iron, which is very commonly used in Kent to cut up root weeds near the surface, and to stir the fallows with. This operation is found to be attended with the very best effects, by permitting the dews or gentle rains that fall to enter the ground, instead of wasting their substance upon the crusty surface.

In feeding cattle with this plant made into hay, I have seen the most beneficial effects arise from it when chopped or cut and mixt with their corn; it not only induces them to masticate every part more regularly, but the viscidity of the hay adds so much condiment to the corn, as to make it more relishing and nutritive than they would be separately given; consequently, they always improve fast upon this diet. When given green to cows fresh taken from other food or pastures, it induces a great flow of milk which improves in colour and flavour, and from which the sweetest butter is made; but it ought to be given to them with caution and judgment, brought to them, and they should by no means be suffered to feed at large upon it, as they would be liable to the same dangers that attend the clovers, by gorging and inflating themselves.

BURNET. POTERIUM SANGUISORBA.

Monoccia polyandria. Linn. Sp. Plant.

Professor Murray mentions only three species of this plant.

I have only met with one place where this plant has been cultivated as a farming product in this county, and that is at Christopher Baldwin's, Esq. at Clapham,* who for many years has been extremely partial to the cultivation of it; and formerly when I had more frequent opportunities of being acquainted with him, it enabled me to see his process in this and other articles; but not choosing to trust to those observations, at least as far as related to this plant, I received from him the following particulars.

Preparation.—The land should be got into a fine state of pulverization, and made perfectly clean by repeated ploughing, which should be deep; harrowing and rolling, such a tilth as would be proper for barley, and of such a depth as would suit carrots, because being tap-rooted, it will find its way to a considerable distance, and unless it has a soft and pervious bottom to work into, the plant will not succeed so well; in this instance he had often to regret the quality of the soil, which being not the most favourable to vegetation, he thought it a strong proof of the value of this plant that it succeeded so well.

Sort.—The garden burnet as it is called is the only one cultivated for the farm.

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* I have since found it cultivated in great perfection at Edmund Boehm's, Esq. at Ottershaw, near Chertsey, in this county.

Steeping would rather injure the seed.

The **Seed** has four sides or angles running from the head to the tail at equal distances, and when new and fresh, is of a bright yellow colour; if brown, it is old or has been badly harvested, and the outside coat or covering is rough.

Seed time.—The beginning of August seems the most proper time for sowing it; but I have known it sown in September with great success, and also in the spring with barley; I hold this however to be very bad policy, as it is then apt to be drawn up spindling, and to lose much of its natural vigour.

I have tried it broadcast and drilled, the former upon 12 acres after a crop of oats, upon two good ploughings, harrowings, and rollings, on which I sowed not less than 160 pounds, which is something more than 14 pounds to the acre. And the latter on four acres which only required five pounds of seed, because I first sowed it in beds, and then transplanted the young plants at about six weeks old, into rows about 20 inches row from row, and 15 inches plant from plant; and I have no hesitation in saying, that although I thinned out those that were sown broadcast in the same manner as a gardener would do his onions, carrots, or turnips, and left them at between eight and nine inches asunder each way, yet the quantity of produce from the four acres, whether in seed or hay, was beyond all conception by much the largest.

Cultivation.—Those which are sown in drills should be carefully hoed in the month of March, either by hand or by horse-hoe; the latter is the most proper instrument, because it will loosen the ground some depth; but as the crop will be the better for a sprinkling of rotten dung about the third year, the ground should be first hoed and cleaned in the autumn, and the dung carted on immediately, from 12 to 16 cart loads, and without delay ploughed in shallow, or what is better, pointed in with a spade, or a tool made like a tan-fork with three flat tines about one inch and a quarter each tine in the face, and which may be done with great expedition; this digging should be performed every season about the end of October or beginning of November, in order to loosen the surface, and to admit the nitrous particles, which fall during the winter months, more regularly through the soil.

When sown broadcast, little or no culture can take place, except eradicating root weeds. It is, however, proper to dung it the third year, and it will bear from 16 to 20 cart loads of rotten dung laid on in September, immediately harrowed-in with sharp tined harrows: nor is it bad policy to bush-harrow the whole crop in the spring, which will spread the wormcasts over the crop, and work the dung and finer particles of the soil that has been thrown up more immediately about the roots. Great advantage ensues to the plants by rolling, if the season has been severe.

Harvesting.—I have always mowed it with cradles the same as clover, and the same treatment must be observed in making it into hay. If it is intended for seed, it will be ready in kindly land by the end of June or the first week in July; and on account of its being so disposed to shed in the field, I have generally thrashed it out on a false floor the same as nurserymen use, having a large sail-cloth or tarpaulin underneath it, before it leaves the ground; the straw or fodder may then be stacked the same as hay, and if a little salt is strewed over each layer, it will penetrate the stalks, and generate a good heat, which will convert it into a very nutritive hay.

Produce.—From 25 to 30 bushels of clean seed, as many sacks of offal seed and chaff, and from one load to one load and a half of hay per acre.

Consumption.—The seed is sent to market and is sold for sowing, being too dear to give to cattle, although they are partial to it when bruised and mixed with oats and good chaff. The plant is given in its green state to cattle, the same as tares and clover, and also when made into hay, and they as well as sheep fatten very fast upon it. I have had, says he, sufficient proof of their fondness for the grass; for having given my neighbour (who was a tolerable large farmer) leave to turn out a lot of Wiltshire wethers, they became so fond of it, as to find their way over and through the fence which divided our lands, and we had afterwards great difficulty in keeping them at home.

His soil is a poor, hungry, shallow, sandy gravel, upon a stratum of yellow or blue clay.

I shall beg to say a word or two here respecting some particular practices of this gentleman. He was formerly a strong advocate for the Tullean husbandry, and those various methods recommended by Du Hamel and other French authors; his farm was but small, upon which, however, he contrived to be making continued experiments, so that he never farmed to profit, which was not his object, and as few knew the theory better, it was his favourite theme, and among the rest I had the happiness of a share. Among the last of his attempts while I resided at Stockwell, (for of late years he has slackened very much, owing to infirmities,) was oil, of which he had formed so strong an opinion, that he used to stile it the essential pabulum of plants. But as oil is a negative character, inasmuch as vegetable and animal oil are materially different in their effects, when he recommended me to try oil, I was desirous of trying that which was most likely to succeed; but he assured me that there was no essential difference in their properties, and advised me to procure the cheapest. I, however, bought the linseed oil, and a small quantity of train oil, which I poured over a heap of fresh horse dung, dividing the heap where the two oils met; they were, however, divided into two separate heaps at the first turning over, and each heap was not only properly mixed this time, but at the future turning, it was judged that each heap would manure a greater quantity of land with at least equal effect, that the dung alone would have done; but in this we were deceived; for having dressed a certain portion of grass land, and a fallow for oats, and afterwards a fallow for turnips with each heap, the grass was evidently much injured by that which contained the train oil, but not so much with the linseed oil, the oats and turnips appeared to have derived no benefit whatever from either, and the latter were infinitely inferior to those in the same field that had been manured with rotten dung taken from old hot-beds. It appeared to me, notwithstanding these dunghills were made as exact as possible, agreeable to the instructions which he gave me, either that we did not in either heap use oil enough, or we used too much, for neither of them ever fermented properly, which dung of such quality could not fail to have done, or our soil, which was a kind loam about two or three feet deep upon a sharp sandy gravel was not proper, or the season was not at all favourable to the application; whatever was the cause of the failure, we never after repeated it. Mr. Robert Barclay, of Clapham Terrace, made a like experiment, as a preparation for barley, and it by no means answered the expectation.

An oil compost was tried a few years since by Mr. John Sewell, an eminent bookseller in London, at his seat near Wandsworth, but in the parish of Battersea; the mixen was made in the following manner, according to an idea which I had the pleasure to suggest to him. A foundation of fresh loam was procured from Battersea Common, with the turf adhering to it, and laid two feet thick, the turf downwards; a certain quantity of linseed oil, sufficient to cover the whole foundation, and to penetrate it a few inches, was poured over it; in a few days the foundation was turned over, the heaps of turf, and lumps of mould were chopped into small pieces, and regularly mixed; a layer of small chalk was put over this, about the same thickness, next a layer of the same sort of turf and mould, the like quantity of oil, and in a few days, the same quantity of small chalk as before. In about two months this heap was turned over with great care and well mixed together, and it lay for 12 months before it was used, having received two more turnings during that period, or three in all. In the month of August it was laid on a piece of cold, sour, coarse pasture, at the rate of from 30 to 40 large cart loads per acre, and it very much improved the quality of the meadow; for the herbage became gradually finer, and much forwarder; whether this was the effect of the oil, the chalk, or the combination, I shall not pretend to decide, as I did not see it before it was laid on, to have examined its outward appearance; but I certainly should have expected nearly, if not quite, the same effects from chalk and mould alone.

BUCK WHEAT. POLYGONUM FAGOPYRUM.

Octandria trigynia. Linn. Sp. Plant.

Professor Willdenow enumerates 43 distinct species of this genus, among them the fagopyrum, (as it is called by the older botanists, particularly Dodonœus) or buck-wheat, is reckoned. It has passed by as many names almost as there are authors, for we find Casper Bauhin calling it erysimum cereale, or corn mustard; Tabernœmontana styles it ocymum cereale, or corn basil; Matthiolus, frumentum Sarracenicum, or Saracens wheat; and Dodonœus, as I before observed, calls it by the generic name of fagopyrum, in which he was followed by Miller. It goes by the name of brank in some parts of England, and the French give it the significant appellation of blé noir or Sarrasin. It was formerly reckoned a plant possessed of considerable medicinal virtues, as may be seen by referring to the Materia Medica of Linnæus, to the German of Frederick Hoffman, and to the works of Dr. John Rotheram; but it is considered of less value by the modern physician. It is said to be a native of Asia, but grows as it were spontaneous among the corn fields in Europe.

It is not cultivated to any great extent in this county, two hundred acres will, I am persuaded, top it in any season, and perhaps one hundred in ordinary seasons. I have not observed a larger growth than seven acres by any one farmer, and not more than three or four acres by those who make a point of growing it occasionally.

It will thrive in most soils, on sands, gravelly loams, hazle moulds, and calcareous soils however poor, but dislikes all argillaceous soils with wet substratums. It is not considered a profitable plant, and that may account for the paucity of its cultivation among the farmers, who have no interest in growing plants merely for the sake of increasing the quantity of game upon their farms.

PREPARATION.—The land lies all the winter in the stubble; early in the spring it is broken up, and lies until March, when after having been harrowed down, it is cross ploughed, and the first week in May it is again harrowed, and landed-up lengthways; the seed is sown upon the furrow, twice harrowed, and finished off with the roller.

SEED TIME AND SORT.—It is highly imprudent to begin sowing before the last week in May, or beginning of June, some defer it until the middle of the latter month; but in the event of its proving very hot and dry, it is at least ten days too late, and if sown before the last week in May, the occasional frosts in that month, to which our climate has of late years been so subject, and such indeed as happened in the last season, would effectually kill almost every plant.

Whenever that happens the ground is directly ploughed up, and got ready for rape, rye, or winter tares.

The sort usually sown is that which is known in the shop by the name of French buckwheat, whose seeds are smaller and triangular, having a black external coat, a white pulp, and the farina also white, but when made into bread mixed with a portion of wheat or rye flour, it turns to a dark colour. In flavour it is more bitter than bean flôur, and more flatulent, and therefore, like the hay that is made of the leaves and stalks, it is by no means a nourishing food, yet as it is known to be eaten in countries where good wheat is grown, as a substitute in times of scarcity, it may supply the want of better.

Seed.—Six pecks per acre sown broadcast for a crop of seed is the quantity usually sown upon the eastern hills; five pecks upon the loams and sands in the western part of the county. Three to four bushels broadcast when the crop is intended to be fed off green, or to be ploughed-in for manure, or to kill weeds in the nature of asmothering crop: from two to three pecks, if the crop is drilled in and intended for seed.

Cultivation.—Perhaps less attention is paid to this material article in regard to this plant than to any other that I know of. Scarcely a thistle is ever hooked, or a dock pulled, all seems left to the same providence that watches over the main crop; but can this be called good husbandry, even supposing the crop to be fed off, or ploughed-in? I presume not. I have been told, as an excuse for not doing it, that the crop will not pay for much trouble; how absurdly do we impose upon ourselves. If the crop is worth growing at all it is worth while to make it clean most assuredly, if it is only for our credit's sake; but it is always so for the benefit of future crops.

Harvesting.—As soon as the seeds are ripe, which may be known by the dryness of the seed vessel, and its elasticity, which generally happens in the early part of September, it should then be mowed and left in the swath to dry about three parts through; it is then turned carefully over, and in a day or two it will be fit to be housed, provided the weather is fair. It is a crop not easily injured by wet weather, and as the seeds do not readily scatter or fall out, it is too often left carelessly exposed beyond all reasonable time, which in course must injure, if not lose, many of the prime seeds.

Produce.—Upon the chalky hills about Riddlesdown, the produce is usually from three to five quarters per acre. Upon the loams and sands to the westward, it increases to six quarters, and I have heard of a solitary instance where seven quarters were produced.

Consumption.—Its application is sometimes for game and poultry, at others for horses and hogs, this is meant of the seed. As green meat it is given to horses, cows, and sheep; the hay is given to horses, and barren stock in the straw yard. When the seed is given to horses, two bushels of it bruised or ground in a malt mill, will actually go as far as three bushels of the best oats; and upon this quantity they have been found to thrive exceedingly; but given to them more abundantly, or fed upon it without intermission, or change of grain, it is apt to bring on humours in the blood, a sort of violent surfeit and the hair to come off. This circumstance is attributed by Mr. Fletcher to its extreme stimulating properties; he therefore cautiously suffers them to be fed with it, and it is principally given after long and fatiguing journeys or in wet weather; he also prefers bruising the seed and mixing it with oats when given to hogs, upon which diet they fatten amazingly. Milch cows fed with the green meat are found to yield an increase of milk, and the butter that is made from it is very sweet and pleasant flavoured. Buckwheat is often mixt with lin-seed, and expressed by the crushers for the oil, such cakes are of inferior value.

The value of a crop of seed is about £8 per acre, supposing it to average about four quarters, and the price 5*s*. per bushel; there is then the fodder worth about 40*s*. making the crop worth altogether £10.

Observation.—As the season is generally warm when this seed is sown, it vegetates very quickly, generally in four or five days, and in proportion as the season is more or less hot it will bear once or twice cutting, the first time just before the plants come into blossom, and as it will resist the hottest and driest season, so in general it grows rapidly all the time. Its produce may therefore be valuable, when other green food is burnt up and scarce. It is, however, sometimes subject to the mildew, and when that happens it is ploughed in, but never mowed before the plough; and for land that is worn out by continued corn crops and repeated liming, it becomes an excellent manure; because the plant contains a large portion of viscous juice which produces a quick fermention in the earth, and no inconsiderable quantity of alkaline salts; of course, for all such soils it becomes a great restorer. Nevertheless, I may risk a conjecture, that if the crop was fed off on the ground, it would yield in the form of dung and urine, a much more valuable and permanent manure.

After Buckwheat, whether the same may have been fed off, ploughed in, or has stood for a crop of seed, some farmers sow wheat upon once ploughing, provided the land is clean, after the latter crop is carried. If the crop has been ploughed in, it is done shallow, it is then lightly harrowed, and cross ploughed deeper, the ground landed up, and the seed harrowed in; but if the land is coarse and rough, Mr. Fletcher leaves it so until spring, when it is well harrowed with the large and small harrows, ploughed shallow and sown with white wheat; or else he ploughs in the wheat under furrow with a neat shallow furrow as late as March, from which he obtains very large crops.

As it appears necessary to sow this seed so late, I should recommend a crop of rye or winter tares, either of them to be fed off as a preparative for buck-wheat; the latter would still come off in time for a season of wheat upon once ploughing, and if this plant is a good preparative of the soil for wheat, after having stood for a crop of seed without any previous manure, how much more must it be after either tares or rye has been fed off?

As a change for the soil in the course of crops, it may be a plant of consideration only, but to those who are anxious about increasing their game, perhaps few plants will more effectually attract them, especially pheasants, &c. It is most strongly recommended to be sown upon the first breaking up of heaths or commons, that have been covered with broom, furze, and heath.

FLAX. LINUM USITATISSIMUM.

Pentandria pentagynia. Linn. Sp. Plant.

Professor Willdenow distinguishes 29 distinct species of this genus, and ten varieties, of which three belong to this plant.

The parishes of Lingfield, Charlwood, Godstone, Tanridge, Oxted, and Horley, have been formerly celebrated for the growth of this plant, but now a few acres in each are all that they can muster. In the adjoining parish of Edenbridge to the former, and along the river side that divides the two counties, a great deal is annually grown, part of which is worked up there, a part finds its way among the manufacturers in the adjoining parishes of Surrey, and no inconsiderable portion of it is manufactured at East Grinsted, in Sussex, where formerly the great mart for it was held, and where also some is grown. This place and Edenbridge may be said to have supplied the wealds of Kent and Sussex, with a strong, close, and very useful cloth for sheeting, towelling, and table linen; even now there are very few, either gentlemen, tradesmen, or farmers, who use any other than their own home made linen; but their wives complain of the thinness with which it is woven, and of the rottenness of the cloth occasioned by the new mode of bleaching, from the application of the oxygenated muriatic acid. Notwithstanding which, it is infinitely more durable than any foreign cloth.

The decrease in the growth of this plant has arisen from two causes; the first is occasioned by the objection which land owners have to the cultivation of it, under an impression that it very much impoverishes the soil, and therefore it almost invariably makes one of the numerous and frequently ridiculous covenants, in modern leases, restraining the tenant from sowing it; a restriction founded upon a mistaken principle, for if flax is introduced instead of a white crop once in seven or eight years, and the land made clean, (and unless it is, the value of this crop will be so much lessened as scarcely to be saleable to the dresser or manufacturer,) and kept in good heart between whiles, flax would be no more injurious, nor draw the land more than a full crop of wheat, rye, oats, or potatoes; on the contrary, this plant would prepare many a heavy soil for a crop of corn. I have often wondered that some of our wiseacres of lawyers, acting as stewards, never introduced a covenant into some of their leases, to restrain their tenants from sowing corn, it is true, they almost did it when they confined them to two crops and a fallow.

Secondly, the great advance in the price of land and labour, the great encouragement given to the growth of corn, and the low price at which the raw article is imported from Riga, Dantzic, and other parts of the Baltic, and sold in London, operate almost as a prohibition to its cultivation; nevertheless, where attention is paid to its proper growth, it is a crop that is found to pay the farmer quite as well as some of the best crops whether corn or pulse that he grows.

The SOIL in which it most delights is a deep hazle loam, or a rich strong mould, with a moist cool bottom; but a strong clay if in good heart and made open by proper dressing and cultivation, even if it has a moist bottom, will grow good flax; a very capital crop is at this time growing adjoining to the broad mead, whose soil is exactly of the description I have just given. Fine crops have sometimes been grown upon shallow sandy loams; upon a sand stone rock, in the parish of East Grinsted, and upon shallow grit stone soils in Somersetshire.

PREPARATION.—If a very fine thread is required, a sandy loam of a good depth is the most proper and likely to produce it; if a fine and strong thread, by increasing the strength of the ground and a due regard being had to its richness, the quality of the thread will be correspondent; this being premised, the ground is generally broken up as soon as the corn is carried, and left rough all the winter, and a complete winter and spring fallow is made of it. If the land has had two white crops (wheat and oats) taken from it, it is then manured with from 20 to 30 cart loads to the acre of good rotten dung, if only a crop of wheat, or peas, or beans drilled and hoed, the fallow is not dressed for flax, and in this case it is where the plant is most likely to produce the finer thread; whereas, where it is manured for the crop, the season moist, and that manure has not properly fermented, the plants will be strong and rank, and the land foul and full of weeds. The seed is usually harrowed in, being sown broadcast upon the furrow; it is very seldom rolled, but finished off as fine as may be with the small harrows, the ground is generally landed up into eight bout lands; but where it lays always dry as in the sandy soils, the ground is made level, and a few water furrows carried through the lowest parts, to take quickly any gushes of rain.

This mode of sowing the seed broadcast is, as far as I have seen and can judge, not to be recommended, because in a moist season which always encourages the growth of weeds, I have observed some of the crops nearly spoilt, especially such soils as abound in charlock and poppy, or thistles; and if the season proves very dry, the plants are starved and stunted for want of a due quantum of moisture, owing very much to their having been sown too thick. If they had been drilled at ten or twelve inches asunder, a seven or a nine-inch hoe, could with great ease be introduced between them, the ground could be kept clean in either a wet or a dry time, and on the prospect of the latter, the plants might be earthed up, which would greatly encourage their growth.

The French and Flemish seldom lay their lands into less than 40, 50, and 60 feet ridges, they then throw out a ditch or channel 18 inches wide, and two feet deep; the channels draw off the water, and in case the land forms a hanging level, a number of stops are put, which are particularly useful in very dry times to enable them to throw the water over any part of the ground, and in wet seasons these stops are removed to give every possible facility to the regular and quick discharge of the water. These channels are, however, only applied to all argillaceous soils, for those which are silicious or sandy are made as flat as possible, without any water furrow, in order that the rains may impregnate every part of the ground equally with its acid of nitre and sea salts, which are both cool and fertilizing.

SORT AND SEED.—The best kind is that which is called the purple Riga flax, but this is a mistake, for the flowers are certainly blue and not purple; the seed from this country is said to be preferable to that which comes from Holland or Flanders, but why I know not, unless it be more hardy, for there is no characteristic difference between them, that ever I could perceive. Indeed, I understood in France that they as well as the Dutch and Flemings prefer the seed directly from the Baltic to that which they save themselves.

From 2 to 2½ bushels, sown broadcast, is the allowance in Surrey to the acre.

STEEPING.—It is no easy matter to find out the age of flax seed by its external appearance: the Dutch, who are cautious to a proverb, try its goodness in a variety of ways; that which is short, roundish, oily, heavy, firm, and of a clear brown colour, is the best, and as far as the seed is removed from any of these properties, the more inferior it will prove. To ascertain its firmness take a large handful of the seed, squeeze it until it forces its way between the finger and thumb, and by the quantity and slowness with which it comes out during this compression you may readily judge of its firmness; and to ascertain whether the seed be well filled and well ripened, put a handful into a tumbler of water, and by the proportion of those which sink compared with those which swim, you may judge of the quality of the seed. Its freshness is also to be discovered by throwing some into the fire, which, as soon as it falls upon the red hot coals, will kindle and sparkle; these are the usual ways among the dealers of trying the seed, but for the growers, I should certainly recommend a certain number of seeds to be sown in pots or beds as I have already recommended for other plants. When that is ascertained, steeping can only be recommended in very light land, in very dry weather, and the seed put into warm milk and water for five or six hours, which will undoubtedly help to quicken its vegetation.

Seed time.—The usual period is March if the season is mild and dry, but a great deal is sown in April: by sowing early, the crop will be ripe and carried in a favourable season by the end of June or beginning of July, and in time for sowing latter turnips, tares, or rye.

Cultivation.—It is indispensable that this crop be kept free from weeds of all kinds, both as they rob the plants of their nourishment, as they tend also to smother the young plants, and as they are afterwards of great inconvenience in preparing the flax for dressing. All manures therefore that engender weeds, such as cow dung, hog dung, and even horse dung, that has not gone through a regular fermentation, night soil, &c. are improper, but lime, bone ashes, soap ashes, fellmongers' poak, &c. are proper, and answer extremely well. It is usual to begin weeding as soon as the plants are two or three inches above ground, and continue repeating until they are five or six, in order that the weeds may at no time get too strong, and thereby injure the crop.

HARVESTING.—If the crop is intended for the flax, and not for the seed particularly, the plants are left growing until the stalks are ready to open, this is said to produce the finest and strongest thread; others who regard the seed also begin harvesting when the stalk is turned of a citron colour, and when the seeds rub out of a clear brown colour, and quite firm. The stalks are pulled up and laid in large handfuls upon the ground, in rows, with the heads of the plants turned to the south. If the season is propitious, 12 or 14 days are quite sufficient to make it perfectly dry; but on the contrary, when it is catching and wet, it is laid in handfuls one above the other, for at least 18 or 24 inches more or less, as the weather may make it necessary.

Others there are who pull the flax while the plant is in full blossom, under an impression that the yarn is much finer; and so in reality it does appear, for it is only in appearance, since it has very little of substance, because that is the time in which nature gives consistence to all annuals; the yarn that is spun from it will be both weak and slimy, and the plant shrivels away to nothing. It wastes very much when manufactured, and after being washed, and grows thinner by bleaching. That which is pulled, when the seed begins to set, is whiter and stronger than the last, and some think it more so than that which is left until the seed is quite ripe, but this very much depends on the season, and it certainly is not so fine. Some farmers, in very exposed situations, tie them up in bundles very expeditiously, and set them upright to dry, and house them the moment they are.

In very sultry weather, in moist and low places, with a constant calm or stagnant air, flax is sometimes seized with a sort of mildew, and especially if the inclosure is small and surrounded with high hedges, or the land light, and has not capacity enough to carry it through in such a season, but it seldom attacks it until it has arrived near the period of its maturity. It first scalds the seed vessel, and then the stalk, turning them white. As soon as the least appearance of it is discovered, it is pulled directly, and housed as soon as possible, because it will in that state take less time to dry than if it had been mature.

Previous to sowing the seed the farmer will do well to make up his mind as to his future intentions about the crop; because I have often remarked that when the land has been in good condition, and any accident has happened to thin the crop, the stalks will be robust, and the seed excellent, but the yarn will be not so fine; on the contrary, the yarn becomes finer in proportion to the quantity per acre, the harvest will therefore be more abundant, and the seed more inferior. These are circumstances which deserve attention, because it is only by that that the proper and full value of a crop can be produced.

Curing and dressing.—As I profess to know but very little of this matter, I am obliged to content myself with such information as I have been able to procure from the farmers and dressers of this place, Lingfield, and Edenbridge.

After the flax has been well watered and dried, and twice swingled, or in other words well broken with the brake by handfuls, or with a mallet, all the bullen, which is the inward substance of the stem, flies off in shivers by the force of the blows, and leaves nothing in the hands of the beater but the thin bark in large threads, through the whole length of the stem. These threads are afterwards hung on a perpendicular board, and bruised with a wooden swingle, which is a thin flat board made of quartered beech, having a handle to it, in order to knock out all the little straws that may happen to remain of the bullen. The gross parts being thus separated from the stem, the threads of the bark are now ready for the next operation, which is that of heckling or combing.

The flax is held very tight and stiff in the hand, and being struck upon the coarse heckle, the hurds or hards which are the coarser parts, and which come from it, are reserved to make the coarser cloth with, after which, the strike is to be passed through a finer heckle, and the hurds coming from thence are reserved for cloth of better quality, and the tear, which means those threads which are pulled asunder and left, are for the best cloth.

In performing these operations, great care must be taken to do it gently, and with a light hand, for fear that all that which is heckled from thence should run into knots, as it is a great object to preserve the yarn soft like cotton, for then it will make exceeding good linen, each pound running at least two yards and a half when manufactured.

It is seldom that flax, the growth of this county, Kent, or Sussex, goes through any further process by our dressers, in order to fit it for a more fine and delicate manufacture; and that being the case, it would be superfluous in me to detail that which is practised only with the Russia or the Holland yarn, and that too in other places. Our dressers are well acquainted with whatever is necessary to enable them to effect it, and there are individuals among them who have dressed flax, and their wives have spun the same, which has afterwards been manufactured in the county, equal to the best Irish or Holland that ever was imported.

The yarn is usually rolled up in bundles, containing four or six pounds weight; but in this county it is more commonly of the former weight; they are sorted out according to their respective qualities, and sold at 13, 14, 15, 16, and 18*d.* per pound avoidupois; of late years only they have acquired these prices, since a few years back, that which is now sold at 13*d.* was then sold at 9*d.* and so in proportion with the rest.

In comparing the growth of flax of different countries, and their produce in yarn, it appears to me that such as we call our best, very nearly assimilates in colour with yarn of the same quality, the growth of Holland or Flanders, which is inclined to a dark grey, whereas Russia, especially such as is called Petersburgh yarn is of a light brown.

Produce.—An acre of flax will yield in seed, if in a season like 1803, and a full crop, from 10 to 12, and even 14 bushels of clean seed. This quantity is, I believe, the extent that is grown in this county, but in ordinary seasons, it fluctuates from four bushels to ten. In other counties, particularly some parts of Kent and Yorkshire, I am told that two quarters is no unusual quantity per acre.

The VALUE of an acre of good flax is from £12 to £16.

APPLICATION.—As the stem of the plant affords us the finest raiment, as well as a variety of useful domestic necessaries; so the seed furnishes us with oil for the painter, which is commonly known by the name of linseed oil, and after this oil is expressed by the crushers, the husks, together with such of the oil and the pulp as remain, are made into cakes for the purpose of fatting cattle and sheep; these cakes weigh about three pounds and a half, and are sold at 14 guineas the thousand, delivered at any wharf in London, by Messrs. Jackson and Dampier, at their oil mills Primrose-street, London. There are many other manufacturers of oil cake, among them Messrs. Shipley, of Carshalton, in this county, and I understand also, Messrs. Were and Co. 7, Garrat Lane, Wandsworth, in this county, make them.

Medicinally, the seed bruised and steeped in water, gives it very soon a thick mucilaginous consistency, and communicates much of its emollient virtues to it; it is anodyne, that is, has the power of mitigating pain, and is of great service in suppressions of urine from inflammation and heat. It envelopes or surrounds the acid salts of the urine, and prevents their vellicating, that is, stimulating and wounding the tender parts, and in some measure supplies the mucus of the bladder when abraded and worn off.

It is to be given in decoction or infusion on these occasions. The infusion must not be made too thick or mucilaginous, because in that state it loads the stomach, and breeds flatulencies in the intestines. A slight infusion of linseed by way of tea, is recommended by many as an excellent pectoral, and the seed is a very common and good ingredient in clysters.

The oil drawn from it by expression is of much esteem in medicine, and supposed good in the cure of catarrhs, coughs, asthmas, and other diseases of the breast, &c.: externally this seed ground to powder is an excellent emollient, as is also the strong mucilage made by boiling the seeds a long time.

Further observations.

In the account of the husbandry of Brabant, written by our countryman Sir Richard Weston, he observes that the notion that flax would only succeed in a rich fat soil had made so strong an impression on his mind, that he could not but be exceedingly amazed when he found in Flanders that they employed their rich lands in producing grass, barley, and wheat, while their more valuable crops of flax, turnips, and clover, were raised by dint of cultivation out of barren sands. With such an evidence as this, which has never I believe been controverted, what is to hinder many of the heaths, commons, wastes, and almost barren sands in this county, from producing as good flax as the Dutch do in similar soils. The bringing any portion of these into cultivation would be a prodigious acquisition, and it would remove the doubt as to the procuring soil for so extensive and so profitable an improvement.

This circumstance, says Dr. Campbell, of employing numbers of industrious people in a kind of mixed labour, in which agriculture is compounded with manufacture, ought to recommend the culture of flax and hemp in no extraordinary degree to intelligent statesmen, who must know how much the public tranquillity depends on providing a constant and comfortable subsistence every where for such as are disposed to earn it; and it has this advantage, that it must both be begun and continued in country places, and probably in different and distant parts of the country. This is actually the case at present in South Britain, where, though great quantities of hemp and flax are grown, and large quantities of homespun linen made, yet little of it goes to distant markets.

If due encouragement were given, and the way once broken, our people would quickly equal and very possibly excel the Dutch. In pursuing this, our cultivations of other kinds, and of corn particularly, instead of being lessened, would be increased. It is owned, that flax is of all others the most lucrative crop; but as the land will not bear successive crops, wheat, barley, and rye must come in their turns.

If therefore we do not give this encouragement most effectually to the growth of flax in Great Britain, our linen manufacture must be ever at the mercy of strangers, who, putting what price they please on the material, will thereby put a check on our industry. Of this there are already great complaints in some parts of this island, and great apprehensions expressed, that the manufacture of coarse linens (which is of no small consequence,) will, by the advance in the price of the raw commodity, be quickly lost. Here then is an argument of necessity, which joined to raising our rents, increasing our people, relieving our poor, and saving perhaps a million a year (he might have added two millions a year) to the nation, is surely sufficient to support a measure to which no solid objection can be raised.

In A. D. 1695, according to Dr. Houghton, we imported 495 tons of flax. In A. D. 1763, from Russia 161,756 pouds or poods, which make about 2576 tons; in 1800, 944,906 bushels, or about 788 tons; in 1801, 612,491 bushels, or about 511 tons; in 1802, 1,059,970 bushels, or about 884 tons.

Our flax, as well as our hemp, is superior in worth as well as in price to what we import, and is equally fit for all the different manufactures, coarse and fine, in which it either is or can be applied. The perfection to which some of them are arrived, may well plead for the notice requisite to bring forward the rest.

In Ireland, they saw clearly that to gain and preserve the linen manufacture, it was necessary to grow flax, and to bring this about, they gave a bounty of 5*s.* on the importation of hemp or flax seed; they gave this gratis to such as would sow their lands therewith; they gave bounties of 10*s.* 8*s.* and 6*s.* on every hundred weight of 35, 30, and 20*s.* an hundred in value; they gave their freedom in country corporations to all flax and hemp dressers; and they held out a premium on every bushel of seed, when at 5*s.* a bushel, which should be exported. As to the premiums and encouragements given for the support of the linen manufacture, an account of them would require a treatise.

To shew that we depend much upon other countries even for the seed, we have only to contrast the quantity imported with the quantity exported, and we shall be satisfied of the truth of it; I take it upon the last three years as a general criterion.

Flax Seed.	1800.		1801.		1802.	
	Imported.	Exported.	Imported.	Exported.	Imported.	Exported.
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.
	944,906	66,409	612,491	27,510	1,059,970	27,551

So that according to this account the statement against us will be in

1800.	1801.	1802.
878,497	584,981	1,032,419

There are several penal statutes in favour of the manufacturer of linen yarn, enacted in the reign of G. IId, particularly in the 22d year, c. 27, and further extended from time to time by his present Majesty G. III; as may be seen in Burn's Justice, vol. IV. page 230 of the 19th ed. and also in the appendix in the same volume, page 780. There is also a penalty of 20*s.* for watering flax in any pond, river, running water or stream, in which beasts are used to be watered; this statute was enacted 33 H. 8, c. 17.

By the 27th G. III. c. 13, sect. 65, a bounty of 4*d.* per pound for flax was proposed to be given for the encouragement of the growth of flax, and for breaking and properly preparing the same for market; this act was to be in force for seven years from the 25th of March, 1787, and from thence to the end of the next session of Parliament; so that I suppose we are to conclude that this act has died a natural death, and it is but right, on the score of consistency, that it should, since there are very few of our legislators who have not tied up their tenants from growing it.

The Act of the 4th Geo. III. c. 26, granting a bounty on importation of rough and undressed flax from his Majesty's colonies in America, is revived and continued until June 24, 1806, by 26 Geo. III. c. 52, sect. 12.

English yarn is made up for sale in bundles of four or six pounds weight, according to its quality; but the Surrey dressers confine themselves almost exclusively to bundles of four pounds weight.

HEMP. CANNABIS SATIVA.

Dioecia hexandria. Linn. Sp. Plant.

There is but one species described either by Linnæus or by Professor Murray, and that is the one usually called the cultivated hemp.

This plant I find was formerly grown in great abundance in the lower parts of this county, but I have not for the last two or three years met with above seven or eight acres altogether, and therefore I should not have taken notice of it, but that I could not pass by a plant of so much consequence to these kingdoms without saying a few words about it. In most modern leases there is a covenant to prevent the farmer from sowing this as well as a variety of other plants, which are considered as impoverishers of the soil; and among land-owners occupying their own estates, it is, I believe, seldom or never thought of, which I attribute to that universal mania for growing corn which of late years has so much prevailed; and secondly, because it is a plant with whose culture and management so few farmers are acquainted; but as the price of corn is falling down to its old level, as the improvements in agriculture are becoming every day more and more diffused, and as from the great number of inclosure bills in the different parts of this county, that have passed the legislature within these two years, a great deal of uncultivated land will be brought into tillage, and as this spirit for inclosure seems pretty generally to prevail throughout the kingdom, it is to be expected that the raising of corn will not always be so profitable as it has been, and therefore farmers will be tempted wherever they have it in their power to grow occasionally some other crop by way of experiment.

We look therefore, upon this plant as one of the most valuable in a national point of view, as one for which there is as steady and regular a demand and sale as for corn, under the present system of commerce; and as a plant that is become now so useful, that in one shape or other it enters almost every manufacture and considerable work throughout the kingdom. Not a vessel can put to sea without a large proportion of it, and while we are paying to the Russians and Swedes such immense annual sums for this very article, and when the balance of trade with those countries is always against us, and as they can stop the supply whenever they please, there cannot be a plant that ought more seriously to enter into our system of husbandry, nor one in which our great land-owners are more interested in countenancing, instead of inflicting heavy penalties for, its growth. For let it be understood, that if every farmer were to grow only from one to five or six acres every year in this county, and that multiplied throughout the kingdom, it would yield an immense produce; and as I have been informed by one of our first manufacturers, that English grown hemp is much tougher and stronger than foreign, we should be certain of commanding the first market and the best price; for as it is become absolutely requisite both for our defence as well as trade, we ought to neglect no method of lessening our dependence upon countries which have shewn at different times a disposition to distress us, and to render the supply of this necessary article as precarious as possible. The farmers grow it in the isle of Thanet, and in other parts of Kent in great quantities, and the hoymen who bring up the seed, and act as factors for them, find a ready sale for it always at the corn market in Mark-lane; the same may be said of the farmers in Lincolnshire and Cambridgeshire, and I see no reason why we should be prohibited from growing it in the heavy parts of the eastern, southern, and western division of this county, where the advantages of good roads and navigation, &c. would afford them a ready conveyance for the seed and for the straw to London.

I am not ignorant of the old objection to the growth of this plant, for the same reason that they object to the growth of flax, namely, that it impoverishes the ground, and returns nothing to it; the same objection may be made to hops, yet if every landlord was to proscribe them for such a reason, he would be deemed very weak indeed in this age of agricultural knowledge. But I remain to be convinced, that hemp is a plant so injurious to successive vegetation or crops, as it is charged with, since I well remember an old pasture field of six or seven acres of uncommon stiff land, belonging to a relation of mine, which had been neglected for years, and was become foul, and much poached; he was advised to break it up and sow it with hemp, which he did for four successive crops, and which paid him each year as well as any other crop he grew; the third year he drained and limed it, putting a kiln and a half of lime on it, and the two following crops were by much the largest and finest; the fifth crop was wheat, without any other preparation or manure, and it exceeded any thing he ever grew before or since; the sixth crop was, I think, beans or oats, and then it was laid down with seeds, and has continued in pasture ever since. This circumstance is at least a proof that strong prejudices are injurious to the country.

As I have met with nothing in this county that can be any guide to me in detailing the mode of cultivating this plant, although I am sufficiently acquainted with the whole process myself, yet I do not think it right to do it, because it could not be considered as the particular system of the county. But to those who are inclined to grow this plant I wish to say a word or two about the seed.

As all the seed of this plant, though apparently of the same quality, will not vegetate, and as it is to be lamented that there is no characteristic mark by which they can be separated, some of them being the male seed which will not grow, and perhaps not a great proportion of them the female, which are the dependent seed, it becomes necessary to ascertain this proportion before the general crop is sown, as a guide to the seedsman, that he may neither sow too thick nor too thin; for if it is too thick, the crop of seed will be spoilt, and if too thin, the plants will be more stocky, and ramify very much, and the straw or hemp will not be so valuable; although the seed may be the finer.

I have before asserted that English grown hemp is more valuable than foreign. The fact speaks for itself, when foreign hemp sells from 27*s.* to 29*s.* per hundred weight, ours will fetch from 34*s.* to 40*s.* We are not the only people who complain of this unjust prepossession. The French import hemp from the north, yet the inhabitants of Bretagne asserted theirs was better, and upon trial before the best judges in France so it was found.

Mr. Houghton tells us, we imported in A.D. 1695, 3573 tons and 14 cwt. In A. D. 1763, we received from Russia, as I am informed, 764,874 pouds of this commodity, which makes about 12,140 tons, which shews the great increase of our manufactures, and the immense saving that would arise, if we could grow this or the greater part of it in the British isles; which from their extent, and the present condition of many of them, cannot be thought impracticable.

The present state of our Importation and Exportation is as follows:

	1800.		1801.		1802.	
	Imported. Quarters.	Exported. Quarters.	Imported. Quarters.	Exported. Quarters.	Imported. Quarters.	Exported. Quarters.
Hemp seed.	61		548	281	431	

The two capital objections to our growing hemp in great quantities, are 1st, that it requires the very best land, which as we have already observed, is not true. At Holme, in Spalding Moor, in the East Riding of Yorkshire, the soil is barren sand, yet with proper care and culture, it produces the finest hemp in England, and large crops of flax also. 2d, that it impoverishes land, so that it must rest long before it can bear another crop. This is best answered by a fact. At Crowle, in Axholm, there is one of the largest fields in the whole island, which hath not been fallowed time immemorial. The method pursued there is this; they manure their barley stubble in the spring with fresh horse or cow dung, or both, and plough it under, then they sow their hemp seed, and harrow it in with a short-toothed light harrow, and if the season be favourable have a good crop. Hemp destroys all vegetables, and leaving the ground free from weeds, it is by a pin-fallow rendered fit for flax in the spring. As soon as the flax is pulled they prepare the ground for wheat or rye. After the corn is got in they pin-fallow it, and in the spring sow barley. Upon the barley stubble they manure and sow hemp as before. Thus they have four crops, and manure only once, and the field which is a mere sand never lies fallow. This husbandry is not confined to Crowle, but is practised in other parts of the island. See Mr. Gee's Observations on the Culture of Hemp, p. 12.

If attentively considered, the expediency of such a measure as that of affording it every sort of encouragement from government will be very apparent. It would be the means of improving land, it would employ a number of hands, it would be an immediate and immense saving to the nation. Besides there can arise no doubt as to its being practicable. If hemp produced from land now in cultivation had a preference at the king's yards, and a small bounty given on such as grew on land brought into cultivation for that purpose, we should soon see the effects; and such lands as Frimley, Bagshot, Horsehill, would be very proper for the purpose.

The harvest being late affords employment for many poor families, at a season when they stand most in need of it; for though it demands no great attention while growing, yet the pulling, watering, beating, swingling, and heckling, makes it pass through many hands to whom it furnishes a comfortable subsistence, and the produce of an acre when it has passed through these operations is very seldom less than ten pounds. The seed also is of great value, and according to what I have heard from my Kentish friends, one acre of hemp, according to the average price of the last three years, is not less than 16 or £17.

There are the same penal statutes in favour of the manufacturers of hemp as of flax, for one law applies to both; and the same penalties will attach for a breach of them. But there is a difference in the bounty which was offered by 27 G. III, c. 13, s. 65, and it was settled at 3*d.* per stone, and this bounty shared the same fate with that offered in favour of the flax. There is still a bounty on the importation of hemp from his majesty's colonies in America, and which continues in force until June 24, 1806.

FURZE, GORSS OR WHIN. ULEX EUROPÆUS.

Diadelphia decandria. Linn. Sp. Plant.

The botanical system does not, according to Professor Murray, boast of more than two species of this plant, the one is a native of the Cape of Good Hope, and called the Cape furze, and the other is the European, or one, usually called French or English e, according as the seed may have been import h wise.

The growth of s becoming every year more and more e ghout the county, in consequence of g scarcity and price of underwood, a nsequence of the increased consump ie as a manure. Its annual growth is large, and, as a crop that pays well with little trouble, I should not wonder if I saw in a very few years the growth of the county doubled. It is used for burning bricks and lime, and as cover for game, and in new inclosures it frequently makes an external boundary to the land with the addition of a single rail or two, even when quicks are planted withinside; it is sometimes sown on the top of the bank, sometimes it is dibbled in if the soil is sandy, and at other times it is planted about half way down the bank; and where the hedge is to be ultimately of quick, if furze is to constitute a part of it, it had better be on the side than on the top, because it will be less apt to draw and exhaust the soil to the great injury of the quick, and few plants do that more effectually than furze. I think it therefore impolitic to sow or plant them near to each other.

PREPARATION.—The land having been winter fallowed is got ready the same as for barley, and as it will grow well in soils that are of small value, particularly deep sands, there does not require much labour in preparing such soil; but when it is sown in such cold, wet, and stiff soils, as are to be met with in Godstone and Lingfield parishes, the soil wants more labour to plough, because it ought to be ploughed deep, to be well pulverized, and brought into a fine tilth; and it ought to be extremely well land drained, but if properly underdrained it would be still better. This plant, although I have seen it grow very well in moist situations, yet I have also seen it flourish much better in dry ones, where the staple was much the same; in the former it is apt to die off in large patches, if the water stands long either on the surface or below it, and therefore it shews the necessity of laying the land dry for this crop. After the seed is sown, it wants only to be lightly harrowed, and if for the sake of making a good finish to the work upon the stronger soils, it may be rolled.

SEED.—The quantity usually sown is from one to three pounds, and this must necessarily vary according as the land is either light or heavy; but looking at it in that point of view in which I have seen the greatest breadth, then I find that one and half pound is the custom, but whatever the quantity, it is always sown broadcast. In Buckinghamshire, where I once advised a gentleman to sow furze, and to drill it in with Cook's drill, we found less than one pound of seed was sufficient for a capital crop at nine inches row from row.

SEED TIME.—The months of March and April are those in which the seed of this plant is sown, I have seen it sown in new made banks during the whole of the summer, and as late as September; but such plants are more likely to be drawn out of the ground during a severe winter, and therefore I do not think it prudent to sow for a crop so late.

CULTIVATION.—I never saw the smallest attention paid to this plant while growing for a crop, although it always is customary to hand weed it when it is intended for a hedge; in every part of this county, I have seen the perennial thistle and the dock rearing their heads above the furze the second year, and scattering their seed in all directions. This want of economy soon shews itself in other parts of the farm, and these weeds certainly do no good among the plants the first and second year.

This crop I have no doubt should be always drilled, not only because of the saving in the seed, but because it is otherwise sown too thick, which draws the plants up weak and spindling instead of being robust and strong. When they are thin and at proper distances from each other they ramify prodigiously, and the difference in the weight of the crop per acre will be as 100 to 80; this fact I have seen proved, and when they are cut down the first time, it is surprising how they will stool out, especially if a narrow plough or a nidget with sharp narrow hoes and tines were drawn between the rows; the soil is refreshed by it, and the plants reap the advantage of it.

PRODUCE.—As furze is sometimes sold by the acre, the buyer making them up or not as may suit his convenience, so in other instances they are cut and made into bundles, and sold by the thousand. A fair crop on land that is well calculated for them will yield from 3300 to 3500, but it is said to be a good average crop when it turns out 3000 bundles to the acre. When the seller makes them up, they are worth from £3 10*s.* per thousand to £4, so that the acre may be computed at ten guineas very fairly. If, therefore, we consider the sort of land upon which it thrives, the little time which it requires to arrive at perfection, and the value of it when so arrived, we shall not be much out of the way if we consider it a valuable crop.

CONSUMPTION.—I have in the introductory part of this account said that it is used in burning of lime and bricks in kilns, the heat produced from it is more instantaneous, and the quantity of heat generated from it during combustion is more rapid than from any other sort of fuel with which I am acquainted; of course its duration is short. I have not been able to learn that any of our farmers ever use it as fodder for cattle, most of them know that it is used for that purpose; but as they think they can grow plants that will be more profitable to their stock, I do not find that any of them resort to it even in times of the greatest scarcity. I shall therefore only say, that furze once properly planted, and in land that suits it, is a crop like underwood, and will replenish itself every year, as the plant blossoms and seeds during all the early part of the season.

The French furze is the sort I should prefer, it is more dwarfy, more bushy, and more calculated for a crop than our common furze; they are both difficult to be eradicated out of the ground, and are not much relished by the generality of farmers on that account.

PHYSICAL PLANTS.

The cultivation of some of these very necessary articles in the materia medica is no where in England (or perhaps in the universe so far as we know) attended to with so much care and diligence as in this county; and as a grower, my friend James Moore, Esq. of Mitcham, stands pre-eminently distinguished; to him, therefore, I stand indebted for such information as the following detail exhibits, and which I have found corroborated by the sentiments of other growers, whose attention to their cultivation in other parts of the county do them more or less credit, according as their pursuits are more or less confined to this subject.

It may not be altogether amiss to say, that Mr. Moore's predecessor and relative, the late Mr. Potter, began the cultivation of these articles in the years 1768 or 9 upon a very confined scale, and by great care, skill, and industry he so increased his growth, as at the time of his death, a few years since, to be considered the first grower in England, and to have amassed a competent fortune. Mr. Moore has, by repeated purchases of land and his manerial rights, which are very extensive, added greatly to the estate, and he now cultivates near 500 acres in physical and agricultural pursuits; which, when the value of land so near to the metropolis, and amidst so many manufactories, and the residences of gentlemen of large fortune is considered, must be deemed an extensive estate.

His land is of various qualities, some part of it very stiff and moist, other parts very dry, and some parts gravelly; but it is his uniform practice to plough both his farming and physic grounds very deep, let the quality of the land be what it may; to keep it very clean, to admit of no fallows, but always under crop, and to keep it in high condition by plenty of good dung, not less than 20 large cart loads to the acre of the strongest rotten dung, a great part of which he brings from the best London stables, or from St. George's Fields. He keeps 16, or 4 waggon teams, of very powerful horses; two, and oftentimes three of these teams go to London every day, all the year round, with herbs, straw, &c. and return laden with dung. I counted no less than twelve carts of different sizes, five waggons, and a timber carriage in his yard; his ploughs are either the common swing drawn at length, or the turnwrest, and his harrows of the usual make of that part of the county.

His yard contains besides the necessary stabling for his horses, waggon, and cart lodges, barns, &c. a counting house with a dry warehouse attached to it; near to these is a large still room, with five copper stills, and without this room is a large horse mill to throw up the liquor into the back. These stills will run off 20 tuns of spirit or oil in 24 hours. Coals are burnt in the furnaces.

At a short distance from this, is a drying house, divided into two apartments, having each of them two furnaces or fire places, wherein coals are burnt; there are three flues in each room, in which the heat goes and returns, and over them, at about three feet distance, canvas frames are laid, resting upon joists, fixed at proper distances for the purpose, on which the herbs intended to be dried are placed; above these frames is the loft where the herbs are taken in, and where the men attend to their drying, &c.

At the back of the stables and barns, &c. is the rick yard, at the upper corner of which is a timber yard, with a carpenter, wheeler, and blacksmith's shop, where this essential part of the economy of the farm is carried on under his eye, and without that loss of time and inconvenience attending the sending every thing from home to each of these professional people.

The tithe of his land is compounded for at 12*s.* per acre.

The poors'-rates are 5*s.* in the pound upon the rack rent.

His farm usually employs near 300 acres out of the 500, but as a very small portion of this is in pasture, it may be said that at least 250 acres are under the plough, and the whole in crop, since, as I said before, he allows no fallows. This last season he grew 100 acres of wheat of the hedgerow sort, which at the period of its blooming promised a very heavy crop; but owing to frost and other accidental circumstances for which this season has been remarkable, the straw blighted and became spotted, vegetation was suddenly checked, the middle clevel of the ears was destitute of corn, and the summits came to nothing; so that he cannot reckon upon more than half a crop, or from 18 to 20 bushels to the acre; but the corn is good; and here was something like an evidence, that neither soil, nor high dressing, could prevent so alarming a calamity from taking place, nor that one soil was more subject to blight than another; since the corn grew upon every sort of soil upon his farm.

I did not observe any thing peculiar in his way of corn farming, and therefore, I shall proceed immediately to give the detail of his physical farming.

And first,

PEPPER MINT. MENTHA PIPERITA.

Didynamia gymnospermia. Linn. Sp. Plant.

The celebrated Willdenow has 22 species of this genus, of which, according to our countryman Ray, no one possesses so much or so powerful an oil resembling pepper as this plant. Its virtues are that of being highly stomachic and carminative.

It is customary with Mr. Moore to grow, communibus annis, 150 acres of this plant, and to renew about 50 acres every year; this he finds absolutely necessary to do, because, both wet and frost injure the roots very much, and when severe, kill them.

Preparation.—The ground having been made very clean by repeated picking, &c. if necessary, and burning, is brought into the finest tilth by fre quent ploughings, dunging, harrowing, rolling, &c. in doing of which the dung necessarily becomes intimately incorporated with the soil; the ground is then set out into lands or beds, according to the quality of the soil, from half a rod to three quarters wide, the plants are then put in and covered up; the first season they are constantly attended to during the weeding season, and they receive at least six or more complete hoeings; this essential part of their cultivation is scrupulously attended to every succeeding year. In the months of November and December the plants are carefully covered with the soil thrown out from the alleys or furrows left between each bed or land, otherwise the repeated weedings in the course of the summer will have so exposed the roots of the plants, as to make them more susceptible of frost and wet, and so much the more liable to be thrown out of the ground by severe frosts.

The expence of the hoeing is six shillings per acre.

The covering at twenty-one shillings per acre.

The produce is very variable, as well as the price, some years it is worth 50*s*. per ton as it comes off the land, and in others £10; but upon the average it will bring £5 per ton. Some years, and on some soils, the produce will be four, six, and even more tons per acre, probably five tons will average it.

This plant is distilled for the oil.

SPEAR MINT. MENTHA VIRIDES.

Didynamia gymnospermia. Linn. Sp. Plant.

The cultivation and treatment is exactly the same as the preceding sort, but it is not so valuable in any point of view; of course Mr. Moore grows but a few acres, about four being the usual quantity; this is distilled for the oil, and sold to the chymists. This plant is cultivated in our gardens, and used at our tables either green or dried. Physically it is stomachic and carminative, but in a less degree than the preceding.

PENNY ROYAL. MENTHA PULEGIUM.

This plant being the least valuable of the three, he plants about two acres annually, which it is necessary to do to make it profitable; and the only difference in the treatment is that of the covering, which it is not necessary to do with a plant that is to be destroyed.

A part of the crop he distils for the oil for the chymists, and the other part he sells to the physic shops.

MARSH MALLOWS. ALTHEA OFFICINALIS.

Monodelphia polyandria. Linn. Sp. Plant.

There are nine species of this genus mentioned in Willdenow. Its uses as an unguent are particularly described in the Materia Medica, 166; also by Hoffman, Germ. 246, and by C. Bauhin, 315.

The cultivation of this plant is particularly calculated to clean land, because by repeated hoeings which very much encourages its growth, the lan cannot fail of being in a better state by every suc operation; deep ploughing is also essentially necessary in order to give room for the roots to proceed down
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shops.

About one acre is planted every year.

It is sold by the hundred weight, and at abou 50*s*. per hundred weight.

WILD CUCUMBER. MOMORDICA.

Monoecia syngenesia. Linn. Sp. Plan

There are eight species of this genus in the Systema Vegetabilium of Murray.

Mr. Moore plants a considerable plot of groun in beds annually, made rich and fine with thi species of cucumber. A wet season is injurious t its fructification.

The fruit, which is the only valuable part o the plant, is sold to the apothecaries company, a their hall near Blackfriars, at 2*s*. per bushel.

SAVIN. JUNIPERUS SABINA.

Dioecia Monadelphia. Linn. Sp. Plant.

There are ten species of the genus juniperus, which includes the common juniper, the cedar, and the savin. As this is an abiding plant, or what is called a shrub, it is planted in rows to remain for a crop, and as it is very hardy, if care is taken of it, it will continue to flourish, and to furnish a considerable supply of green shoots for many years; but as it would not be politic to trust entirely to this circumstance, it is usual to plant a certain number every year.

It is not tenacious of any particular soil, so that there is but depth enough; but the more it is pulverized, the better the plants thrive. The shoots are cut green, and with the leaves are distilled, from whence an oil is extracted in great use among farriers; it is sold at 10*s*. per pound.

ANGELICA, ANGELICA ARCHANGELICA.

Pentandria digynia. Linn. Sp. Plant.

Professor Willdenow describes six species of angelica, every one of which, except the verticillaris, (or whose leaves surround the stalk or stem like the rays of a wheel) are natives of the coldest climates. The one under description is found in the greatest abundance in Lapland, upon the banks of rivers, and other humid places.

From half an acre to one acre is the annual growth, and is planted every year for the purpose of succession, although it is two years before it comes to perfection. The ground is made rich with dung, and made loose to a great depth by ploughing or digging [illegible] he more moist the soil the better the plants th[illegible] The sets are then planted at 2½ feet row fr[illegible] row, repeatedly hoed and weeded during the se[illegible]n. If the plants are suffered to stand for seed the second or any succeeding year, the roots are not so fine; and where the roots alone are required, they stand for a certain period, are taken up, well washed and dried, and are then sold to the physic sh[illegible]

The stalks wer[illegible] ned and eaten as celery, of which h[illegible] aint resemblance; but it is as an a[illegible] is so highly esteemed, being [illegible] ered one of the finest in Europe.

It is by some [illegible] rs sold to the confectioners for swe[illegible] confection it is not only one of the [illegible] ut the most agreeable imaginable. [illegible] to expel wind and strengthen the stomac[illegible] is surpassed in that instance only by ginger.

The value of it I am not acquainted with.

HOREHOUND, MARRUBIUM VULGARE.

Didynamia gynospermia. Linn. Sp. Plant.

Willdenow particularizes 14 species of this plant, none of which, says Hoffman, possess any medicinal virtues except the one now under detail; the peregrinum which is a native of Sicily, Crete, and the dry parts of Austria, and the Creticum, which is found in the East Indies. See Hoffman Germ. 210.

The mode of cultivation is so exactly a counterpart of the preceding article as to make it unnecessary to recapitulate it.

The branches and shoots are cut off and dried, tied in bunches and sold at four-pence per dozen. The mart for it is Apothecaries-hall.

CHAMOMILE, ANTHEMIS NOBILIS.

Syngenesia polygamia superflua. Linn. Sp. Plant.

There are 17 species of this genus in Murray, but Professor Tournefort was of opinion that the plant I am about to detail did not belong to the genus Anthemis. It is not my business to dispute this point here.

There are two varieties of this species cultivated in our physic gardens for the shops, viz. the single and the double, the former is grown for, and sold almost exclusively at Apothecaries-hall, the latter finds a ready sale at the chymists and physic shops.

A spot of light dry soil made extremely clean, is chosen for this plant; the ground is set out in beds of four feet wide, with eighteen-inch alleys between, and on these beds the sets are planted about eight or nine inches asunder, and kept carefully hand weeded; they will, if the season is not too wet, bear an abundant crop the first summer. In November, or the early part of December, the beds having been just weeded, the alleys are dug, and some of the finest mould thrown over the plants, which not only greatly refreshes them, but effectually covers the roots which the frequent we [redacted] may have exposed, and preserves them from the frost.

Mr. Moore has seldom less than four acres of the double sort, and fewer of the single under cultivation. The average produce is about six hundred weight per acre, which is sold at one shilling per pound; the gathering costs one penny per pound.

WORM[redacted]IA ABSINTHIUM.

[redacted]*a superflua. Linn. Sp. Plant.*

Of [redacted]here are 22 species, of these [redacted]ort and tarragon make a [redacted]

These pla[redacted]eous, that is, the stem dies down ann[redacted]root abides, and which forms the intermediate link between those plants which are shrubby and whose stems are permanent, and those plants which are annual and which altogether die in a year, or two when they are termed biennial. These plants, I say, are planted in rows, at from 18 inches to two feet asunder in a deep rich mould, or made so by tillage; are kept perfectly clean during the summer, and are refreshed with soil from the intermediate spaces during the progress of digging them in the month of November, or the early part of December; but as it is the seed only that is wanted, it is thought to be the most profitable method to take up a certain portion of the roots every three or four years, and after cutting away all the decayed and old parts of them to replant the young roots.

The seed is sold to the physic shops as well as to the distillers and rectifiers, who, I suppose, use it among their British compounds. The price is usually 30*s*. per hundred weight.

LIQUORICE, GLYCIRRHIZA GLABRA.

Diadelphia Decandria. Linn. Sp. Plant.

There are only six species of this plant mentioned in Willdenow, and among them I find two whose roots are endowed with a rich sweet flavour peculiar to themselves, these are the echinata and the asperima, the latter most particularly so, as well as extremely long; it is found between the Wolga and Isicum, and is well described by Professor Pallas in his Icin. 1 app. No. 121, t. m. f. 3; the former of the two has long been known in our English gardens, but I do not know that it has ever been cultivated for its medicinal uses, because I do not find any of the growers are acquainted with it; the latter I am wholly unacquainted with; but as it is easily obtainable, if it is not already among that most superb collection at the royal gardens at Kew, it might be well worth the attempt to procure it. I introduce these hints as a stimulus, and in order to shew how much we may improve our collection of physical plants.

Of the plant under consideration, Mr. Moore has seldom less than 10 acres, which are planted in rows at 18 inches asunder, in a very deep rich soil made loose by tillage; it is usual, therefore, before planting, either to trench the ground with the spade two feet deep, or to trench plough it, but he gives the preference to the former method; and after laying down the trenches, which helps to pulverize it, 20 double cart loads of rich spit dung is laid on per acre, evenly spread, and pointed in with the spade; the ground is then lined out, and a small triangular hole being made with the spade where the root or set is to be planted, it is then put in, the earth returned, and gently trod so as to close the mould about the roots; it is kept clean during the summer, and about November the old stalks or stems are cut off close to the ground with a sharp pruning knife and cleared away, the spaces between the rows are dug up and left rough, taking care as they proceed in this operation to clear away all the weeds that may be among the plants, and to bury them.

The third year after planting, if the soil is suitable to them the roots are usually taken up with the spade, thoroughly washed, cleansed of their filth, and the fibres trimmed off, as well as all the smaller roots and ramifications. The latter are termed the offal, are dried, and then ground to powder. The main or principal roots are then packed up for sale, and sold to the druggists.

The prime roots are sold from 50*s.* to £3 per cwt.

The powder at £3 per cwt.

A fair crop will yield 20 cwt. per acre.

The expence of taking up the roots with the spade alone is £10 per acre.

The ground is usually sown with wheat, unless wanted for any particular crop, and the produce is generally immense, almost exceeding credibility, seven or eight quarters per acre. Quere, Is this not another proof of the advantage of deep ploughing, which the taking up the roots may be termed, for many of them run a yard deep, which they are obliged to dig under to get up without injury to the roots?

HYSSOP, HYSSOPUS OFFICINALIS.

Didynamia angiospermia. Linn. Sp. Plant.

This genus contains six distinct species, but I do not perceive that any other species is medicinal besides the plant above alluded to, indeed it appears that it is so from the exclusive title given to this species.

The ground having been previously prepared in the same manner that has been described for the other medicinal plants, and the plants having been previously raised from seed, either the preceding year, or very early in the present, are planted out in rows, 18 inches asunder, kept clean hoed, and the following autumn the ground is carefully dug between them. When the plants have been two years quartered, all the green shoots are cut off and tied in bunches, about twelve of which make one pound: the plants are afterwards destroyed, so that it is necessary to make a fresh plantation every year to keep up the succession.

These bunches are sold to the chymists and physic shops, at 6*d.* per dozen.

This plant is by some considered extremely grateful to the smell, and is usually recommended against asthmas, coughs, and all disorders of the bres nd lungs, whether boiled in broths or otherwise used. The chymists distill the plant, and a water or liquor is drawn from it, which is considered a good pectoral. Notwithstanding which, such is the prevalence of fashion for foreign drugs, that this plant is no longer in repute, and therefore Mr. Moore seldom grows more than half an acre.

ELE LA HELENIUM.

ia superflua. Linn. Sp. Plant.

M ecies.

A root are made use of in the is absolutely necessary that to e soil should be made rich and open. It is then planted in rows at two feet asunder and kept very clean; the first autumn the old stems and leaves are cut off close to the ground with a sharp knife, and the intervals between the rows well dug, and some of the finer mould laid upon the plants; the second year if the plants have thriven, they are deemed in perfection, when some of them are left for seed, and the rest taken up for the roots, which are carefully washed, trimmed, and dried.

The third year the plants are renewed; but it is to be observed, that as fresh ground is always chosen for every sort of physical plant, Mr. Moore deems it the most prudent way to plant every year about half an acre.

The seed is sold at 2*d.* per pound, and the roots at 4*d.* per pound.

POPPY, PAPAVER SOMNIFERUM.

Polyandria monogynia. Linn. Sp. Plant.

Of the nine species described by Willdenow, no less than five of them are mentioned as being of use in the Materia Medica. The species now before us is, however, the plant that is cultivated in the physic gardens for the heads.

The ground has two or three ploughings not very deep, and the land is brought into fine tilth by rolling and harrowing; it should be moderately rich, and laid level.

In March, or the beginning of April, and on a calm day, the weather being dry, the seed is sown, at the rate of something less than a pound of seed per acre. If the land plants well, they are carefully hoed out, and left at about six inches asunder, and nothing further is done to them until the pods are ripe, when the ripest are picked over, and put into bags holding about 3000 each; as fast as they ripen, they are gone over, and treated in the same way until the whole are gathered; they are in this state fit for sale. I do not find upon inquiry, that any distinction is made between these several gatherings, all of them being sold at one and the same price, but as far as my judgment and observation goes, it appears to me that every gathering is inferior to the preceding, and consequently that the first must be infinitely the most valuable, as possessing the greatest portion, as well as the most potent essential oil.

The expence of gathering is six-pence per bag.

They are sold to the chymists, druggists, and physic shops, at 30*s*. per 1000.

Mr. Moore sows annually about two acres.

LAVENDER, LAVANDULA STOECHAS.

Didynamia gymnospermia. Linn. Sp. Plant.

Miller desc[illegible]nt characteristically by the name [illegible]use this sort is peculiarly used in [illegible] Medica, not but the French and [illegible] distill the spica also. These are the [illegible]t of eight species described by W[illegible]re used in medicine, so far as I can lear[illegible]

The ground [illegible]ed by deep ploughing and ample dre[illegible]nts being raised from seed in a bed of fine mould, are planted out in March or April following, in rows at two feet asunder, they are carefully hoed and weeded, and in the autumn pruned and trimmed, and during the month of October or November the ground is turned in; every other year 20 loads of the best rotten dung is laid on per acre, and regularly pointed in. As the flowers are not sold, but distilled by Mr. Moore, they are not bunched when gathered, as if for sale, but are thrown loose into mats, in which state they are carried to the still room, where they are distilled for the oil. The expence of cutting the flowers is 21*s*. per acre.

The oil is sold to the perfumers and chymists at 40*s*. per pound of 16 oz.

Between five and six acres are planted annually.

DAMASK AND RED ROSES. ROSA DAMASCENA ET VILLOSA.

Icosandria polygynia. Linn. Sp. Plant.

As there is no difference in the cultivation of these roses I have not separated them. Professor Willdenow enumerates 39 distinct species of roses, besides, as he says, almost numberless varieties, particularly of the hundred-leaved sort cultivated in the English gardens. I do not find that any of our growers of physical plants cultivate any other sort than the two above-mentioned, whereas Desfontaines, L. C. says than an essential oil of the most fragrant kind, far surpassing any other rose, is obtained from the petals of the musk-rose; it is reasonable to believe that this observation of the French chymist is well founded, since, as a perfume, it is very sensibly more odoriferous than any other. This observation may be worth the attention of our growers, notwithstanding the plants of the musk are not so easily propagated as the other sorts.

The ground is prepared in the same manner as for lavender or liquorice, and the roses planted three feet asunder, are kept well cleaned and hoed, and in the autumn all the superfluous and dead shoots are cut out, and the ground dug between them. Every other year they are refreshed with 24 loads of spit dung, pointed in between them, and close to the roots. The flowers are gathered every other day in dry weather all the season, by women and children, by the day, into baskets containing one bushel, and carried to the warehouse. They are then sold to the chymists at two shillings per bushel.

Mr. Moore has about seven acres of the former and three of the latter, of each of which he plants a few every year, to keep up a succession in high order.

Besides the [illegible] oned articles, some of the growers, s[illegible] nderson, the successor to the celebr[illegible] n, of Covent Garden, Mr. Reffell, a[illegible] k, grow pot-marygold, garlick, shall[illegible] landine, basil, saffron, mezerion, clary, [illegible] erfew, baulm, marjoram, French sorrel, garden burnet, common or tart rhubarb, medicinal soapwort, savory, Scotch Alexanders, tansey, rue, lemon-thyme, coltsfoot, medicinal vervain, rosemary, rocambole, &c.

Of these and the preceding articles, Mr. Reffell, and Mr. Killick grow each of them between 30 and 40 acres. Messrs. Drivers have lately begun a plantation near Sutton, and there is one or two more growers upon a small scale.

In addition to those, we have some gardeners who occupy several acres of land in the growth of such articles, as daisies, wallflowers, sweetwilliams, primroses, violets, pinks, bachelors'-buttons, and the like, and insignificant as these articles may appear, yet it is wonderful the returns that are annually made in them. What will the Board think of several thousand pounds per annum?

They are carried to the several markets in London, where they are exposed for sale in full blossom, and I am informed meet with as ready sale as any sort of vegetables. Indeed Mr. Shepherd, who lives in Horsemonger-lane, Southwark, and who was an old servant of my father's, has accumulated a considerable competency, and almost disdains the idea of carrying these things to market, having always a ready sale for them at home upon his own terms. Mr. Arthur Connor, of Mitcham Common, is a large grower, and it is no unusual sight to see three or four carts following each other in the height of the season from his grounds.

TIMBER AND UNDERWOODS.

BIBLIOTHECA BODLEIANA

Welcome, ye shades! ye bowery thickets, hail!
Ye lofty pines! ye venerable oaks!
Ye ashes wild, resounding o'er the steep. THOMSON.

Of all the subjects which can interest an Englishman, or which have come under our consideration, the present claims a distinguished place; for next to a due supply of food and raiment, every Briton is peculiarly concerned in this article of our wealth, whether it be to afford us fuel for domestic purposes, or for our various manufactures, or for the no less important purpose of self defence.

In every country, and in every age we find that the fruits of the earth, and the trees of the forest were given for the benefit and for the use of mankind. Since the introduction of the various luxuries of life, which have in a greater or less degree taken hold of every nation upon earth, and more especially since our vast intercourse and conquests in the eastern world; and in order to administer to those luxuries as far as the nature of the thing will permit, we find that the trees of the forest have fallen a sacrifice to this most unfortunate but universal mania.

It is no wonder then that those forests are now no more, which had used to rear myriads of ponderous bodies, which though neither gay with blossom nor rich with fruit, have supplied us with timber of various sorts, and for sundry peculiar uses; which when felled and fashioned by the skill and ingenuity of the artist, add magnificence to architecture, constitute the very basis of that navigation which has rendered this kingdom the very terror of the world, whose commerce (such as no nation ever saw) it wafts to the most distant regions of the habitable globe, and consequently is the very life and soul of our manufactures.

Tradition has handed down to us the places in this county, in Sussex, and in Hampshire, on which the lordly oak, that king of the forest, in all the majesty of pride, grown venerable with age, and with wide stretched arms seemed as it were to bid defiance to time; but it could not withstand the cruel and unrelenting axe. Notwithstanding which, such was the immense quantity in each of those counties, as to be deemed inexhaustible. But so late back as the days of Elizabeth we find that able lawyer Manwood telling us, that so careless and negligent were the officers appointed under the forest law in the discharge of their duty, that they had suffered the decay and destruction (in almost all places within this realm) of great wood and timber; the want whereof, as well in this present time, as in time to come shall appear in the navy of this realm.

In those days this idea of Manwood's appeared a mere chimera, and was treated with levity accordingly. But in the succeeding reign of Charles II. we see this chimera not only not vanished, but even begin to be realized; for so rapid is decay and so certain is destruction, that a deficiency was thus early begun to be felt; and as the demand increased the supply failed. We all know that timber is not the growth of a day; it is not like manufactures, which in proportion to the demand, by multiplying the hands the produce can be soon prepared for market. No! timber, such at least as is fit for the larger purposes of the navy, requires the growth of a century, even upon the best adapted soils, although fine timber for many inferior purposes may be fit in seventy or eighty years. The scarcity of timber which prevailed in those days, was however confined to those counties that bordered on the coast, for in the internal parts there had been but a partial destruction, owing to the badness of the roads which prevented its being conveyed to the dock yards but at an expence too great to answer.

The consumption was also in those days much greater in proportion than in the present, oak was almost the only tree that was used for the navy, or for building purposes, but now we use elm, beech, and fir, as well for the former as for the latter. The laying bare therefore all the counties upon the coast, could not but make a very conspicuous figure, and the alarm of scarcity appears to have operated so very powerfully upon the minds of the then ministers, that we find them recommending the immediate measure of making a provision for a future supply; a part therefore of the new forest was taken in, and by inclosing about 300 acres, was intended as a nursery for young oak.

In the reign of King William, we find that no less than 4000 acres were inclosed and planted in the same forest, which appear to have been planted and protected with great judgment. It was an object for me to see them, although out of the county, in hopes that I might learn something therefrom which might be useful to me in this survey; and I confess I was amply repaid for my trouble, for I found them in a flourishing condition, secure from all danger, and the inclosures again thrown out into the forest. In case any curious person should wish to examine them, they will be found by inquiring for Burley Walk, where 600 acres were inclosed, in Rhinefield Walk, the same number, in Boldre Wood Walk, above 400, in Egworth Walk 1000, in Dinney Walk, above 500, and in Castle Malwood Walk, an unknown quantity.

This plantation may be strongly contrasted with others made in the reign of George II, which were either injudiciously or dishonestly managed; and those which have been made in the present reign seem to have been conducted as badly, indeed it would appear as if this business had always been considered a mere job, about which nobody had any interest, and therefore every one contrived to do as little as he could, and that little carelessly, and there being neither honesty nor judgment, it was impossible it could succeed. The peculations too in that forest exceed all credibility, but as these and other matters more properly belong to the survey of that county, I shall return to my subject.

In 1652, Heylin says, in speaking of the mines of coal in the north, that London and other great towns could not possibly subsist without them, under the present decay of woods and neglect of planting. And something better than a century afterwards, we find a very respectable author, in his remarks made during a tour through England and Wales, in 1762, observe, that it is truly lamentable to see the prodigious scarcity of large timber throughout the kingdom, countries that formerly abounded and were almost an entire forest, now growing corn or fattening the ox. No young plantations starting up to cheer the dreary scene, or to supply the future navies of Great Britain, but every young spendthrift as he comes into possession, (and he might have added also, the old gambler, &c. &c.) falls to the ground the remains of his father's or relations savings, to satisfy his extravagance and his ambition.

It is probable that the first idea of destroying the forests, and granting particular privileges to those who converted wood into corn land, arose during the reign of Edward II, for we find him and his ministers making an attempt to increase the revenue, by cultivating those forests which belonged to the crown, but there appears to have been some obstacles in the way of it, which at this distance of time cannot be rightly understood, since it does not appear that any of those forests were let for that purpose before his fifteenth year. It was however remarked, that the destruction of these forests and woods, would increase many thousand families for the public service, would bring many thousand pounds into the public coffers, and would convert much waste land to habitations of Christians, and therefore it it would not be neglected.

However n of the finest timber might have a mstances which I have just d ore insensible and invisible one op ry great degree to the diminution throughout the kingdom, and th om the uniform, unskilful practice of cutting off the lower boughs of trees, not close to the stem, but at a foot or more from it. This observation has been made almost time out of mind, and although the strongest proofs of it have been given, yet the practice is uniformly continued to this day. A very old author, who wrote at the beginning of the last century, viz. 1717, quotes the following words from what he then calls an ancient author, but mentions no name. 'Tis a misery, saith he, to see how our fairest trees are defaced by unskilful woodmen, mischievous borderers, and rapacious tenants, who go always armed with short hand bills, hacking and chopping off all that comes in their way; by which our trees are made full of knots, boils, and cankers, to their utter destruction: good husbands should be ashamed of it. As much to be reprehended are those who either begin this work at unseasonable times, or so maim the poor branches, either out of laziness or want of skill, that they leave most of them stubs; and instead of cutting the arms and branches close to the stem or boll, hack them off a foot or two from the body of the tree; by which means they become hollow and rotten, and are so many conduits to receive rain and the weather, which perishes them to the very head, deforming the whole tree with many ugly botches, which shorten its life, and utterly mar the tree.

I have this season seen some trees, of between 30 and 40 feet meetings, felled, whose boughs have been taken off in the manner before-mentioned, and almost every one of them proved more or less unsound from this very cause, and very few timber dealers will give a full price for trees that have been so served, but as I propose to enter more at large upon this subject when we come to speak of the diseases, natural or acquired, incident to the oak, I shall for the present suspend any further observations thereupon.

Guthrie remarks that the soil of England is peculiarly adapted for raising timber; and the plantations of trees round the houses of noblemen and gentlemen, and even of peasants, are delightful and astonishing at the same time. Some have observed a decay of that oak timber which anciently formed the vast fleets that England put to sea. But he adds, as no public complaints of that kind have been heard, it may be supposed that great stores are still in reserve, unless it may be thought that our ship yards are partly supplied from America and the Baltic.

are to credit a recent publication issued for the ustification of a noble lord late at the head of our dmiralty, we shall presently see that there is no superabundance of timber, particularly oak; and that not one of our dock yards contains, as I am informed, either the assortment or the quantity which the navy board wish should be annually laid up.

The custo s, says the author of the
public ee years stock of timber
in han oads. On the 31st Dec.
1800, pre ministry's coming into
office, it wa .... 28,187 loads.
On the 31s 01, it was 26,337
31 02...... 23,724
31st cember, 03...... 25,053

Lord Spencer, when he presided at the admiralty, introduced a regulation that there should be an officer in each yard who should have the responsibility, care, and management, receipt, and conversion of all the timber, which was become indispensable; because it is a fact that the receiving clerks and measurers in all the yards, were not only in fee of the contractors, but were their agents also. Some idea may be formed of this coalition by one instance, viz. of 862 trees reported to the navy board to have been cut up in Deptford yard, under the inspection of the comptroller and senior surveyor in October, November, and December, 1801, no less than 336 were so defective or rotten as not to be fit for any of the principal conversions for which they had been received and paid, which is at the rate of 112 rotten logs per month, for one yard only, although a great part of them had not been six months received from the contractor; and by the new mode the timber-master seeing that the contracts are honestly fulfilled has created a great saving, since the 25,053 loads delivered in to the 31st Dec. 1803, actually contained more serviceable timber than 40,000 loads would have done under the old system, which is a much larger quantity than has been contained in the yards at any one period for ten years past.

Taking for granted what is here asserted, it appears that the navy of this kingdom consumes annually nearly, if not above 117,000 loads of timber, and the quantity consumed in all the different mercantile yards throughout the kingdom, is little, if any thing short of 100,000 loads more, to which may be added 10,000 loads at least for private provincial purposes, and the total quantity will be somewhere about 227,000 loads of timber cut down and consumed every year.

In order to ascertain the quantity of timber or number of trees now growing in South Britain, averaging ten feet meetings, I have had recourse to the following calculation. Though it may be far from the truth, yet in my communications with different persons, stewards as well as timber dealers, many seem to think that the difference cannot be a great deal either way; and it may lead others who may be fond of contemplating these subjects, who have more time and abilities than I possess, to investigate the point more minutely.

The mode I adopted was as follows; supposing

Gre tain to contain 108,000 square miles,* equal 69,120,000 square acres, and as the Board of Agric ulture have ascertained that there are 7,888,977 acres of wastes, these I deduct, together with 4,231,023 acres for downs, roads, rivers, canals, water, towns, and villages, from the total number of square acres, and that leaves me 57,000,000 of

Suppose we ere may be five trees averagi twenty acres, it will give us 12, ich being divided by 227,0 n e annually consumed, and th esult will take near 54 years to consume ce any thing less than 20 feet mee ur dock yards, and as that size and upwards will necessarily decrease the proportion by increasing the distance, I think I may venture to say that if we go on cutting as fast as we have done for the last ten years; every large stick, at least down to that size that can be come at, will be consumed in thirty years.

The distance at which I have supposed the trees to be, may at first sight appear very considerable to those who are in the habit of seeing many trees as they pass along the road; but if they consider for one moment, that supposing in some counties every tree they saw was an oak, and those stood as thick as they do in many parts of this county, yet many of these may, and always do, turn out unsound, cut therefore to waste, and as such will not suit our dock yards. Again, many of these may be elm, beech, ash, or hornbeam; and what is strictly the case, many parts of the same county scarcely produces an oak, unless they are to be met with in parks; thus from London to Godstone, to Reigate, Dorking, Guildford, and Bagshot, a compass of two-thirds of the county, there is not oak sufficient for common agricultural purposes; while on the remaining third part, bordering on Sussex, it formerly might be called a forest, and as full as it could hold of large fine thrivin g timber; but now a days, where there is one tree that exceeds or measures twenty cubical feet, there shall be 500 that will not measure ten feet, so amazingly are they thinned within the last ten years. Again, there are many counties that produce very few oaks indeed, considering their size, perhaps not more than may be sufficient for their own consumption, such as Middlesex, the greater part of Hertfordshire, Oxfordshire, Wiltshire, Dorsetshire, Devonshire, Somersetshire, Gloucestershire, with the exception of the forest of Dean, Lincolnshire, Cambridgeshire, Norfolk, and Suffolk, and several others: taking this into consideration, it is not clear to me that I have not allowed them to stand too thick.

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* According to Guthrie, England is 360 miles long and 300 broad, its contents must be 108,000 square miles: 640 acres in a square mile being the allowed computation, if these sums are multiplied together they will produce 69,120,000 square acres: but Templeman says, that England contains 49,450 square miles, or 31,648,000 square acres. Dr. Grew, computes the quantity at 72,000 statute miles, and consequently 46,080,000 statute acres; we have therefore nothing sufficiently exact to form our computations from. If the latter should be right, and I believe it is nearer the mark, the deficiency will be still greater as to the quantity of timber.

Again, there is hardly one wood on all the southern side of the county where large trees formerly stood, and where they have been much thinned out, that the tellers and young timber have not been more or less injured thereby. In the parish of Lingfield, for example, where twenty years ago many of the woods were full of the finest timber imaginable of all ages, now the taking away all the large the rest has been laid so open, as to check the growth, and they have been dwindling away ever since; and at my recommendation the proprietors are going to stock the whole up, for I am persuaded it never answers to plant young trees in an old wood; supposing that proprietors could get the better of the old idea, that planted oaks never make such good trees and timber as those of spontaneous growth. It is better therefore to plant a new wood altogether than to think about repairing an old one.

Wherever such circumstances as these happen we cannot calculate upon a regular succession in the woods, and as to the hedgerows it is not to the interest of the tenantry to suffer much more young stuff to grow to timber than is sufficient for the necessary repairs of the farm, therefore but little is to be expected from that quarter. Our chief dependence must consequently be placed upon such as may be expressly set apart in woods and plantations for the purposes of the navy.

That this county is becoming more and more bare of timber every year, to a most alarming degree, is so notorious as not be disputed, let any man examine the hedgerows, let him examine the woods, and let him cast an eye on the waste at New Chapel, at the timber yards in Reigate, Dorking, Stonebridge, and Vauxhall, and he will see comparatively very little standing, but an immense quantity lying prostrate, converted and converting, and no large timber in either case, although there have been trees sold in this county for fifty pounds a stick.

As an instance of destruction on one estate, no less than 15,000 trees have been cut down within these three years, the largest of which did not exceed ten feet of timber, and the greater part of them did not exceed four feet. Ash were cut down as low as one shilling per tree. What prospect have we of ever seeing (or our children either) large trees by the ordinary course of nature? Is it not likely that timber, and the increase of it, will every where give way to the more quick returns, and perhaps in many cases larger profits of agriculture? I think it is. What then is to become of this kingdom, when the unfortunate system of states in every quarter of the globe keeps us in such a condition as to look for independence only by the power of the sword, and when one of the great sources of that independence, our navy, is falling off from our own supineness and indiscretion?

But it is no unusual remark, that so long as we have the commerce of the world, we can always buy timber. I had much rather we bought corn, because we could soon recover that; but from whence are we to be supplied? Are we to go to France? They are, as far as I am any judge, from the countries I travelled through, in a worse plight than ourselves. Are we to go to Norway or America? And what is it when we have got it, after paying the prime cost, freight, and insurance? Are we however always sure of a regular supply, and is there no such thing as jealousy on the part of the foreign powers, and a desire to lessen, if not to crush our growing greatness, and to bring us down to a level with themselves? Are we to go to India to build men of war of teak wood; to establish dock yards there, to carry our best workmen to teach the natives, in order that at some future period India may become a second North America? Is our best blood and treasure to be spent in far distant countries because we have no energy at home? Are we to engage such men as Mr. Larkins, however capable he or they may be, as purveyors, at a very heavy expence, and send them to Holstein, or any other part of the Continent to mark out naval timber, because the governments of this country, in spite of the repeated warnings which they have had for above a century, have not thought it worth their while to turn their attention to this most important subject? Are we sure, after we have bought this timber and converted it at an expence equal to the prime cost, that the French will not invade the Duchy, and save us the trouble and further expence of conveying it to England? Is there any security equal to that which is to be found in our own kingdom? And are we to go on viewing the present without thinking of our future navies? Or are we so *panic struck* with the criticalness of our situation, as to give up ourselves as lost, without making one exertion beyond that of procuring foreign timber, and enriching by the purchase other countries, to repair our extreme oversight and unpardonable inattention to the dearest interests of our country? No, I hope not; let us no longer raise money in support of foreigners who have and always will act the most treacherous part, while we are in want of that money to raise oaks; self defence, as it is the first, so it is, or ought to be, the main spring of all our actions; let us set heartily to work, let us tell the people of England that we want one, two, or more hundred thousand pounds, or as many millions by way of lottery or taxes, to enclose such of the wastes as will raise forests of oak; let them be made sensible of their situation and the necessity for so doing; let them be convinced that all this is to be done, not as a job to answer the views of this or that minister, but by a system of the most rigid economy, upon a scale that is most likely to answer the great end, and by a management, and under the conduct of men of the first practical knowledge, selected for their abilities and exertion, and not through favour and interest, because he happens to be some great man's steward or gardener. When all this has been made fairly out, such is the ardour of my countrymen, and such their spirit of manly independence that I do not hesitate to declare it my firm belief that no money would ever come from their pockets with greater cheerfulness and alacrity. And should no narrow policy afterwards pervade the undertaking, they would soon behold a young navy rising out of the spot that now saves the half starved sheep from absolute death; they would contemplate with infinite pleasure the satisfaction they feel in having lent their proportion in forming such a scene; but no time is to be lost, we cannot recall seasons as we do our fleets and armies.

> Nil actum reputans si quid superesset agendum.—Lucan lib. 2. v. 267.
>
> He reckon'd not the past, while ought remain'd
> Great to be done, or mighty to be gain'd. *Rowe.*

Planting is not so serious a thing as many people imagine. That soil must be either extremely tenacious and difficult to work, or the situation must be extremely remote or inaccessible, when exclusive of fencing it will cost more than £4 to £6 per acre, which shall contain from 3000 to 4000 trees, of sorts most suitable to the soils. But if it be upon a good scale (for the larger the plantation the cheaper it will be in proportion) including fencing &c., I think I can venture to find responsible men in every part of the kingdom who will undertake to do it, and keep in repair for 12 months the whole plantation, for little more than £5, or £6, according to circumstances. The thinnings out from time to time will soon bring in an ample interest for the money thus expended, if the plantation thrives, and care be taken to keep out cattle. We think nothing of spending £10,000 in embellishing and furnishing perhaps a suite of rooms which are every day getting out of fashion, and are thus reminding us of our vanity and folly, while we think it an amazing sum to lend out at almost compound interest £1000 to the permanent improvement of our estates. That it is so the following fact will prove.

In the year 1756, the Earl of Fife began to plant, or rather to make a nursery, which he planted with seedling trees of different sorts purchased from the nurseries. The second year he may be said to have begun planting (viz. 1757) on the banks of the river Devern, and on a soil consisting of a deep loam. The plantation succeeded very well, and was of some extent, and he kept on planting from year to year, until he had executed the original design. I am not however in possession of sufficient data to say what was the total expence of planting, fencing, &c. nor the extent of ground planted; but I am warranted in saying, that the thinnings out of his Lordship's plantations have of late years yielded him about £1000 per annum, and these trees always selected from the worst or least thriving in the plantation. The trees will average about 7 feet and ½ per tree; but there are larch and silver firs of much larger dimensions.

Before I close these observations I am aware that I should fail in my duty if I did not state that some attempts have been made to raise a supply of oaks upon some parts of the royal property, and I hope they will be attended with success; but extensive as may be the plan, and followed up with every possible attention, yet it is but a nut shell to what we want, and what we must have. Indeed I am perfectly of opinion with that worthy patriot Sir William Dolben, that no act of inclosure should in future pass the legislature, that does not provide for a plantation of timber trees, according to the size of the inclosure, and a certain number of trees in each hedge-row; this would help us, notwithstanding the operation would be slow; and to secure them from depredation or injury, we might resort to Charles the first's measure of exacting a heavy fine upon each misdemeanor.

It seems to be the general opinion that the finest oak trees are raised from the acorn standing where it was sown; but as I differ entirely from this received opinion, I will give my reasons for this dissent, and afterwards confirm them by facts.

First. 'Tis the nature of all trees to put forth one root first, whether it be from the acorn or the berry, and then some lateral roots according to the nature of the plant and the quality of the ground; the oak is peculiar in this instance, because it almost invariably runs to the bottom of the soil that is congenial to it before it puts forth many side roots, especially in a loose hollow ground, and then at the end it puts forth its feeding roots, if I may so call them. When this tree comes to be five, or six, or more feet, and having but few of these feeding roots near the surface, it becomes next to impossible to take it up well, without probably losing the greater part of them, and consequently endangering the tree.

Secondly. The case is however very different when the tree is taken up at one or two years old; it has then but a small head, so that a small root will support it, and this root not having yet penetrated deep, and lying within a small compass of ground, may be taken up with less loss than an older one.

Lastly. When these young trees are taken up, the tap root being generally more or less injured, it is customary to cut off that part which is so injured, the end so cut off with its slope lowermost will at that place, as well as higher up the fleshy part of the root, put forth many small roots, which lying nearer the surface invigorate the tree, and encourage its growth; and a tree so served may be removed again and again if care be taken to keep its head in proper shape, and the roots from being unnecessarily lacerated; and with great success as to its future growth.

Having thus stated my reasons, we will next elucidate them or rather prove them by facts.

In the parish of Charlwood, in this county, and on a farm occupied by Mr. Pryor, a very respectable farmer and tenant to Sir Thomas Wallace Dunlop, Bart., I was sent down to value the timber previous to its being sold about three years since. In looking over them I could not help remarking the difference in the manner of the growth, the cleanness of the stems, and the magnificence which many of the heads of some trees had over the others.

Upon observing this to Mr. Pryor when we had finished our measurement, he assured me that all those had been planted by his uncle (not sown) when he was a boy; that his uncle took great delight in planting, and was very proud of these trees; that they grew very fast while they were young, and soon out-topt those which were much older and had sprung up spontaneously; that they shared one common fate, nothing having been done to either of them, but keeping out the cattle; that some of the largest trees which were nearest the house he used to amuse himself by bending to the ground, and though then a boy, he perfectly recollects that they were more pliable, or as it were more elastic than the others; and it was a remarkable fact, that soon afterward the spontaneous trees were attacked in their upper branches with moss, their growth appeared checked, and they never afterwards recovered themselves effectually; while the transplanted trees had scarcely any moss, were clear stemed and growing vigorously, and in general were worth from 10*s.* to 15*s.* each tree more than the others. As all the trees grew promiscuously over the farm, many of them adjoining to each other in the same hedge, there could be no difference in the soil, and therefore I leave it to the opposers of planting oak, to account for this unquestionable superiority. And as to the quality of the bark, or the soundness of the timber, or the fineness of the grain, I have Mr. Hodgson's (of Lambeth) word for it, who bought them, that he never either before or since saw better, and he may be referred to for the fact, and so may Mr. Pryor, of White's-Green farm, Charlwood.

These trees averaged twenty feet of timber, but some of those that were nearer the house measured above thirty feet after they were cut down.*

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* In soils congenial to the growth of oak, I will relate another proof of the rapidity of its growth. An acorn was sown at Beckett, the seat of Lord Viscount Barrington, on the day of his birth in 1717. In November 1790 it contained 95 feet of timber, which at 2s. per foot would sell for £9 10s. the top was valued at £1 15s. The girt at five feet from the ground was about half an inch more than 8 feet. The increase of the girt, in the two last years, was four inches and a half. It grows in rich land worth £1 5s. per acre. Again:

In the year 1794 Mr. Austin, an eminent timber dealer at

There are some oak and chesnut trees in Felbridge park, very handsome in size and appearance, which have evidently been transplanted there, and I believe by the late Mr. Evelyn, father-in-law to Sir George Shuckburgh Evelyn, Bart. There are many fine oaks on Frimley green that were transplanted there.

Another case of transplanted oaks I cannot help taking notice of, notwithstanding they are at a great distance from this county.

At Tredegar in Monmouthshire, the venerable seat of Sir Charles Morgan, Bart. is an avenue of oaks of a most magnificent size, which were planted there, as I was informed by the late amiable Mr. John Morgan, (the last male heir of that most antient family,) by his grandfather; his own father used to speak of them as the greatest delight of the old gentleman, because I believe he planted them with his own hands, and therefore he took great pains to make them the ornament of the place; they are planted at equal distances, in straight lines, and upon knolls. The soil is gravelly, and such as is not congenial to oak; yet they have acquired an immense height, are straight and clean, and well headed. The largest trees measure 217 feet, or four

Lingfield, in this county, bought an estate adjoining to his house, in which was an oak tree that stood close to a cow shed, which at that period was estimated to contain about 25 feet of timber. In nine years afterwards it was measured with the greatest exactness, and was found to contain as near as possible 50 feet of timber. The year following, and about the same time, it was again measured, and it had gained exactly five feet. Here the richness of the sullage was evidently the cause of this extraordinary growth.

load 17 feet of round timber: and throughout, the avenue, which consists of 879 oaks, will average two loads per tree.

Upon such a soil it is matter of surprize that they have succeeded so well, and acquired such dimensions, but I was sorry to observe that some of their tops were beginning to decay; but after a period of 200 years, they may be fairly said to have seen their day and performed their duty. There had been a tree or two blown down the winter before I was there, which I understand cut up sound and well grained.

There are some sweet chesnuts usually called Spanish, which contain near 130 feet of timber, and some fine large beech, both of which are coeval with the oak, and are still vigorous and flourishing, and appear perfectly sound.

If I were inclined to bring further proof of the advantage of transplanting oak, I should quote my Lord Warwick, and many other noblemen and gentlemen who can boast of as fine timber trees as ever were seen; but if these are not enough volumes will not effect it. My friend Mr. Forsyth perfectly agrees in my doctrine.

It is necessary that I should apologize for the length of this subject, but as Count Rumford says, the passionate fondness that I feel for the favourite objects of my pursuits frequently hurries me on far beyond the bounds which prudence would mark to circumscribe my adventurous excursions. If, however, I have said any thing that may be the means of awakening my countrymen in these times of public calamity, it will administer to me such a satisfaction as applause cannot give nor censure take away.

OAK, THE COMMON ENGLISH, QUERCUS ROBUR.

Monoecia polyandria
Linn. Sp. Pl.

> Let India boast her plants, nor envy we
> The weeping amber nor the balmy tree,
> While by our oaks, the precious loads are borne,
> And realms commanded which those trees adorn. Pope.
>
> There grew an aged tree on the green,
> A goodly oak sometime had it been,
> With arms full strong and largely display'd,
> But of their leaves they were disarray'd:
> The body big and mightily pight,
> Thoroughly rooted, and of wondrous height.
> *Spencer's Shepherd's Calendar:*

Linnæus, and professor Murray mention but fourteen species of the oak, but we have certainly fifteen distinct species, besides four or five permanent varieties, constantly cultivated in the best nurseries about London. How many more professor Willdenow may bring forward I am unable to say, for he has yet only reached the class polyadelphia.

The soil in which the oak seems to thrive in greatest perfection in the southern parts of Surrey, is either what most people call a strong clay free from stones, a strong loam, or in other words a lighter or more loose clay, or a loam mixed with sand stones, with a substratum of clay; in places that are almost continually moist, but never thoroughly or long wet, and in others for the most part dry. In the one, as the tree makes but slow progress towards perfection, its shoots being short and stocky, but clean, its period of existence is long. In the other, as it receives and imbibes more moisture, its shoots are long and clean, its leaves larger, and of a more lucid green, its bark wide, and the whole plant puts on a more vigorous appearance; such a tree by being, as it were, forced, sooner arrives at perfection, and somewhere about 100 years begins to decay at top, its bark to get hidebound and mossy, and every symptom of decline is manifest. As this is a decay of nature, and not of disease, so it should be cut as soon as this decay is visible: but this decay is often brought on prematurely, by ignorance and by wantonness. By the latter in consequence of the propensity which the lower orders of people have for stealing fire wood, in which diabolical work whole villages and towns of all ages and sexes partake, though the most mischief is done by women.

As soon as the trees have dropped their leaves, these people go armed with bills, and cut and mangle all the branches within their reach, which they seize another opportunity to carry away. The provident steward, wood-man, or tenant would, if they knew their duty, and practised it, immediately amputate the remainder of the limb close to the bole, leaving the wound cut as smooth and perpendicular as possible, to which he would apply my friend Forsyth's composition, if he knows how to make it, and has any at hand; or else a plaister made with horse or cow droppings, some sifted loam free from stones, and as much chopped hay, as

properly incorporated will make an adhesive
r; if chamberlye is used in mixing the ingre-
so much the better. When this has been ap-
n the wound, let some fine sifted wood or
hes be sifted on or thrown against it until no
vill stick, and being made quite smooth, will
ut the air and heal up the wound.

as too often happens, no notice whatever is
of the mangled state of these trees, nay, the
man and steward too do not hold with cutting
nb off close to the stem, but leave it a foot or
listant, when cut close, they say the weather
continually upon it finds its way into the
of the tree and causes its decay; and in this
hey are perfectly right, so long as the wound is
ed to remain as rough as possible, but if it is
smooth with a sharp chissel, and afterwards
ered over so that the air may be entirely ex
l from it, the wound presently heals over,
o further injury will be sustained. On the
ry, when a part of the limb is left, and that
f splinters, the rain, the dews, and the snow
g on those uneven surfaces, keep them con-
ly moist, and there being little or no vital
about that part rottenness is produced,
if not timely stopped by the taking off the
above the diseased part, will very soon eat its
nto the heart of the tree, to the inevitable in-
hereof. It is always more or less the case
young trees whose wounds would much sooner
ver; and cannot fail of being infinitely more
ith old trees. In this opinion my friend
th agrees, see his admirable Observations on the

Diseases, &c. of Forest Trees, p. 418, oct. ed. 1803. The English oak is not subject to peculiar diseases, so as to endanger either the existence or the progress of the tree; both young and old are sometimes attacked with the mildew in hazy thick weather, and of late years the younger shoots scarcely ever escape the frosts in spring, which generally destroy them, and prevent the otherwise good prospect of a crop of acorns; these frosts, particularly in April and May of 1803, were so severe, as to cause the trees to lose their leaves, and it was a long time before they recovered this calamity.

Some soils and situations are particularly subject to ivy; this plant winds round the stem and branches, and by its twisting and compressive powers, as well as by extracting nourishment by means of its roots at the several joints, does incredible mischief. Indeed, our great bard Shakspeare had this in contemplation when he asserted

> ———————— He was
> The ivy, which had hid my princely trunk,
> And suck'd my verdure out. ————

As to the galls which are generally produced in April, and continue until June, they are produced by insects called cynips, and in which they shut themselves up. They are more frequent on pollards, and the more stunted trees, than on those which are of free growth, though when these are checked by a cold raw time when the leaves are first expanding themselves in April, they are then in a more fit state to receive these insects, because in proportion to the degree of check which the tree may have received, the juices of the leaves will be more or less viscous. Each gall appears to be inhabited by one insect, I have been told that two are often found, but I never could find more than one, which presently turned to a chrysalis. I am of opinion that these insects pass through several generations in the course of the year, that it is probable their eggs may be deposited on the bark of the tree, and when the warmth of the sun in the spring has hatched the young insect, it crawls about the leaves taking therefrom what little it may require for sustenance, until it is near its period of change, when having found a leaf more fleshy and viscous than the rest, it sucks up the juice, which it discharges in globules sometimes not bigger than a large pea, which becomes concreted by exposure to the air. These galls are first of the colour of the juice, which is green, and the older they get, the more yellow they become; they are commonly called mushroom galls, and are peculiar to the oak. In a fine, mild, serene spring, when every species of vegetation flourishes uninterruptedly, few or no galls are to be found during that season, which evidently proves the first cause to be some sudden check.

Linnæus says thus, "when the gall insect has fixed her eggs in the leaves of the oak, the wound of the leaf swells, and a knob like an apple arises, which includes and nourishes the embryo." F N. 947.

The learned bishop of Llandaff describes galls as excresences from the oak, they are formed from the exudation of the juices of the oak; this exudation is not spontaneous, it proceeds from the puncture made in the bark by an insect; in the hole which it has made it deposits its egg, and the exuding juice hardening, forms a proper nidus for it. Most of the galls have holes in them; the young insect having eaten its way through the substance in which it was hatched: in many of those which have no holes, the insect may be discovered in the inside by breaking the gall. The property which an infusion of galls has, of tinging a solution of vitriol black or purplish, renders it serviceable in discovering the minutest portion of iron in chalybeate water. He tried a piece of oak perfectly dry to see if it had the same effect as galls, and having procured a piece that had been felled a year, "I rasped, says he, off from the bark, from the sap, and from the heart of the wood equal weights, and put them into equal portions of hot water. After they had stood some time, it was evident that the bark had given a higher colour to the water than the heart had done, and that the water in which the sap was put had extracted the least colour. Into equal portions of a solution of green vitriol, I put equal parts of these several infusions, expecting to have seen the vitriol turned black by them all; but the event was, that the sap infusion produced very little change of colour; the bark infusion gave a dark brown, and the heart infusion instantly gave one of the most vivid blues I ever saw. If the raspings of heart of oak be boiled for an hour in water, they lose this property of forming blue with vitriol, but the cold infusion forms a fine blue; and if a solution of vitriol be poured upon the raspings, the whole is changed into a blue mass." 1 vol. p. 243.

Dr. Thornton says that galls, although the work

animal, are nevertheless entirely of a vegetable
re. It is considered by him to be the most
erful vegetable astringent known, notwith-
ding it has not been employed so often, or in
a variety of cases as many others have been.
emorrhoidal affections, applied as an ointment,
d with eight times their quantity of hogslard,
s been found of great use.

ccording to Count Rumford, "those trees which
in inhospitable climates, and those I ap-
end which are of a very solid close texture,
consequently which are capable of bearing the
of the severest winters, contain very little
ry liquids. The sap which circulates in their
ls is thick and viscous at all seasons, and can
ly be said to be fluid. Is there not the strongest
n to think, that this was so contrived for the
ess purpose of preventing their being deprived
l their heat, and killed by the cold during the
er?"

As the bodies and branches of trees are not co-
l in winter by the snow which protects their
from the cold atmosphere, it is evident that
ordinary measures were necessary to prevent
being frozen. The bark of all such trees, as
esigned by nature to support great degrees of
forms a very warm covering; but this pre-
on alone would certainly not have been suf-
it for their protection. The sap in all trees
h are capable of supporting a long conti-
ce of frost, grows thick and viscous on the
oach of winter. What more important pur-
could this change answer, than that here in-

dicated? And would it not be more than folly to pretend that it answers no useful purpose at all?"

" It would appear from various experiments (which were before described,) how much the simple embarrassment of liquids in their internal motions tends to retard the propagation of heat in them,
and conseque ge out of them; and
when we treme smallness of the
vessels in wh oves in vegetables, and
particularly when we recollect that
the substance small tubes are formed,
is one of the uctors of heat known;*
and when w e additional embarrass-
ments to the heat, which arise from
the increased viscosity of the sap in winter, and to the almost impenetrable covering for confining heat, which is formed by the bark, we shall no

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* I lately, by accident, had occasion to observe a very striking proof of the extreme difficulty with which heat passes in wood. Being present at the foundery at Munich, when cannons were casting, I observed that the founder used a wooden instrument for stirring the melted metal. It was a piece of oak plank, green or unseasoned, about ten inches square, and two inches thick, with a long wooden handle which was fitted into a hole in the middle of it. As this instrument was frequently used, and sometimes remained a considerable time in the furnace in which the heat was not intense, I was surprised to find it was not consumed; but I was still more surprised on examining the part of the plank which had been immersed in the melted metal, to find that the heat had penetrated it so inconsiderable a depth, that at the distance of one twentieth of an inch below its surface, the wood did not seem to have been the least affected by it. The colour of the wood remained unchanged, and it did not appear to have lost even its moisture.

longer be at a loss to account for the preservation of trees during the winter, notwithstanding the long continuation of the hard frosts to which they are annually exposed.

"Since, therefore, we see that the sap of trees becomes more and more viscous as it decends on the approach of winter from the mere effect of cold, so on the other hand, as the warmth of spring advances the sap becomes more and more fluid: if that sap is checked by any sudden cold, it immediately condenses, and the young shoots and leaves being thus deprived of their usual support, sicken and turn yellow, and the leaves curl and wither, and by a continuance of this cold the foot stalk separates from the branch, and the leaf falls to the ground; it is at some period of this check, that the leaf becomes in a proper state for this insect to produce those galls I have before-mentioned."

We are not to forget that an oak differs no vast deal from a mere mass of matter, and therefore may in every period of its growth be food for some sort of insect or another. The great Locke has, with his usual discrimination, pointed out in what this difference consists, and it seems to him to be this; that "the one is only the cohesion of particles of matter any how united, the other such a disposition of them as constitutes the parts of an oak; and such an organization of those parts as is fit to receive and distribute nourishment, so as to continue and frame the wood, bark, and leaves, &c. of an oak, in which consists the vegetable life. That being then one plant, which has such an organization of parts in one coherent body, par-taking of one common life, it continues to be the same plant, as long as it partakes of the same life, though that life be communicated to new particles of matter vitally united to the living plant, in a like continued organization, conformable to that sort of pl his organization, being at any one inst ne collection of matter, is in that par e distinguished from all other, and i ual life which existing constantly fro ent both forwards and backwards, in ntinuity of insensibly succeeding p the living body of the plant, it has which makes the same plant, and all the p it, parts of the same plant, during all the time that they exist united in that continued organization, which is fit to convey that common life to all the parts so united."

The bark of the oak is considered one of the most powerful of the vegetable astringents, and its universal use and preference in the tanning of leather (which will be noticed hereafter,) renders the opinion very probable. Accordingly it has been employed as an astringent medicine, and recommended for every virtue that has been ascribed to astringents either internally or externally employed, as except its degree of power, it has no peculiar properties to distinguish it from other astringents.

Joined with the camomile flowers it has prevented the return of the paroxysms of the ague. It is known in the shops by the name of cortex quercus.

All these virtues which have been ascribed to the bark of the oak, have been also found in a considerable degree in the capsulæ or scaly cups, which embrace the bottom of the acorns.

It is very fortunate for this country that very little if any potash is made here, the consumption which such a manufacture would create in oak, would be truly alarming, since it requires no less than 106 pounds avoirdupois of dry peeled oak, to produce 19 ounces of ashes. These ashes were treated by the bishop of Llandaff after the same manner, in which he had endeavoured to ascertain the proportion of earth and saline matter in barilla and kelp ashes, and the 19 ounces obtained rather more than one ounce and a quarter of saline matter. "From several repetitions of the experiment with ashes of the same kind, it may be concluded, that 15 ounces of these ashes contained 14 ounces of earth not soluble in water, and one ounce of saline matter; from this proportion it may be easily collected, that above 1300 tons of dry oak and probably above 1800 tons of green oak, must be burned in order to obtain one ton of potash.

In vol. II. p. 327, there are some curious experiments on the distillation of woods, which, as they are short I will detail. These woods consisted of oak, box, mahogany, and sallow, they are all dry and old, and were cut into small pieces about half an inch square, before they were put into the earthen retort.

" Heart of oak.		Box.	Mahogany.	Sallow.
Weight distilled.	96 oz.	96	96	96
Liquid.	37¼	61½	33½	48
Residuum.	30	26½	27½	20½
Loss of weight.	28¾	8	35	27½
	96	96	96	96

"The liquids separable from woods by distillation, consist partly of oil, but principally of water impregnated with an acid, from which also a volatile alkali may be disengaged. The oil varies in quantity according to the nature of the wood, the hardest woods and the hardest parts of the same wood abound il; thus both oak and box contain e weight of the wood more oil th d. That part of the oil which is fi m the wood is so light as to float d of a yellowish colour; its quantity, t small, compared with that of thic y oil which follows it. It appears fro ount, that the quality of the liquid separable from wood by distillation, is wholly the same with that of the liquid separable from pit coal by the same means.

"Henckel informs us that 150lbs. of oak will produce 62lbs. of charcoal; but he does not tell us whether the oak was dry or green, whether it had its bark on or was peeled, whether it was all heart of oak, or partly heart and partly sap, whether the operation of making the charcoal was discontinued as soon as the wood ceased to smoke, or protracted some time longer; and yet a difference in any one of these circumstances will sensibly influence the weight of the charcoal procurable from a definite weight of wood."

The woods which the bishop converted into charcoal were dry, and had been felled many years, the weight was taken with great exactness, and in one foot cube of oak the weight was 892 ounces avoirdupois. "Cotes states the weight at

925, and Emerson at 800. To the more obvious sources of this diversity in the weights of equal bulks of the same kind (such as the wood being green or dry, being cut from the boll or the branch of a tree) one may be added, which has not, I believe, been sufficiently attended to, I mean the great loss of weight which in certain circumstances, the same piece of wood sustains, by a simple exposure to the atmosphere in the course of a few days.

"From the middle of a branch of an oak tree, which had been felled in April, and exposed without its bark to the hot summer of 1779, I cut September 4, a round piece about six inches in diameter, and three in thickness; September 15, I cut from the heart of this piece of oak a small slip three inches in length, $\frac{1}{4}$ of an inch in thickness, and 79 grains in weight; at the same time I cut a similar slip from the sap of the same piece, the weight of which was also 79 grains; these two pieces were put into the drawer of my study table, and being weighed again September 25, the heart of oak had lost eight grains or near $\frac{1}{10}$ of its weight; the sap had lost 12 grains, or above $\frac{1}{7}$ of its weight. Now if the weights of several equal bulks of these woods had been taken on the 15th and on the 25th of September, it is obvious (notwithstanding the contraction they might have suffered,) that there would have been some difference in them, though the woods themselves appeared equally dry on both days.

"This speedy diminution of weight which wood undergoes by exposure to the air, being a matter of some importance in an economical view, I will mention another experiment which I made on the subject. A piece of ash cut 17th March 1780, from the middle of a large tree which had been felled six weeks before, was accurately weighed; its weight was 317 grains, its length three inches, and its breadth t weighed again March 24th, it had urse of seven days 62 grains, or near ght. I weighed this same piece of w 5th of August in the same year, but it ost any thing of its weight from arch to the 25th of August. T e tw ak, mentioned in the last experiment, d also on the 25th of August, 1780; they had neither of them lost in the course of 11 months quite one grain; hence it appears, that the matter which dispersed from wood after it is cut, is soon evaporated: this matter probably consists chiefly of water. The carriage of wood, especially by land, is very expensive: if an oak or an ash tree were cut into boards, or scantlings, upon the spot where it is felled, there would be a saving of the carriage one ton in six or seven, from the evaporation of the substance of the wood; to say nothing of chips and other refuse parts." Vol. III. p. 20 to 23.

Professor Gren describes the specific gravity of the heart of old oak at 1.1700 = 4 drachms, 55 grains.

"The specific and absolute gravities of bodies is thus ascertained.

"Water being the usual standard on account of its specific gravity, we have endeavoured to ascertain the absolute weight of an English cubic inch of distilled water, and found it to contain 252.26 grains troy, according to Brisson's statement, hence 1728 cubic inches or the cubic foot weighs 75 lb. 3 oz. 6 drms. $5\frac{1}{8}$ grs. troy, 62 lb. 4 oz. $3\frac{1}{2}$ drms. avoirdupois. And the English pint of distilled water (wine measure) holding $28\frac{7}{8}$ cubic inches, weighs 1 lb. 10 oz. $\frac{3}{16}$ drms. avoirdupois, which pretty nearly agrees with Kruse's statement, at 8 lb. 5 oz. of the same weight to the gallon. The weight of any larger bulk of the common substances whether liquid or concrete, is readily found by multiplying their weight in the inch, with the number of those desired; or by multiplying their specific gravities with the weight of a pint, or cubic foot of water."

From what has been before said, it will be readily seen that the timber in this country is not felled according to any system, but chiefly according to the necessities or caprice of the owners. The governors of Christ hospital who have a good deal of well timbered land in Burstow and Horley, have regular periodical falls, and as the timber is in general handsome and of fair size, they always get the best price. Indeed, I am not sure whether the timber on their estates is not the best we have in this part of the country, out of parks, &c.

The value of timber in the rough or standing, has been gradually rising for the last ten or 15 years; at one period it was owing to the great and extraordinary demands for the king's and private yards, at another time owing to the former cause, and to our disputes with the northern powers, which created such an extravagant price for deals, (I believe £40 per hundred for the best Christiana have been paid,) that it was found to be cheaper to build with oak even at the high price it then bore, than with fir; and now when there is no such great demand f se purposes, there is so large a c atly to increase the price of timber hin the last four or five years, bark ality has risen £10 per load, or 50 p

If the timber i , clean, and will cut into plank, or 1 feet meetings, with handsome heads, near roads, and within an easy distance of water carriage, oak will at this time fetch from ten to twelve guineas per load, of 50 feet round measure, or 40 feet cube. The buyer is at the expence of falling it, barking it, and preparing it for market, for the labour attending, which the heads when reduced into faggots and cord wood ought to pay. In fitting it for market, it is manufactured into planks of various thicknesses and lengths, according to the size of the timber, into knees, (but these are not so much in request now as formerly,) and the lesser parts of it, and the smaller timber are converted into posts of all sizes, rails, spokes, and staves, split into pales for fencing, and into laths, and the short pieces made into pegs.

The planks, knees, and pegs go to the ship, and barge, and boat builders, the staves to the coopers, the rails, pales, and laths to the carpenters, bricklayers, and plasterers, and the spokes to the waggon and coach wheelwrights.

The bark after being run from the tree is set up in lengths for some time to dry, it is then conveyed to some barn or out building where it is cut and hatched, that is, the moss and other impurities, such as the rough rind, &c. is shaved off, and then cut into pieces of two, three, or more inches in length, packed in large hair bags, and sold to the tanners; at the mouth of each bag is some pieces shaved, but entire or not cut, and on one of these pieces is marked the weight of the contents of that bag. It is absolutely necessary that the bark should be kept dry, not only to preserve its tanning qualities, but to act honestly by the tanner who buys by weight.

Hatch bark is sold by the load of 45 cwt. and if the bark is the produce of thriving young trees, it is worth at this time 1804, 30 pounds or guineas, delivered in; the quality of the bark, and the manner in which it is dressed, naturally determining the price,

The leaves and saw dust of oak, and other trees of which the bark is used in tanning, have been lately applied to the same purpose by a Mr. Klein, with the greatest success.

Oak saw dust is the principal material used in dying fustians. It gives all the varieties of drab colours, and shades of brown, according as it is managed and compounded.

From the immense falls of timber for public or private use within the last ten years, compared with the ten years preceding, it might be expected that the price of bark would rather have felt a depression, especially if we credit the tanners who declare that the price of their leather has been falling in the foreign markets: on the contrary, however, it appears, that notwithstanding they have been making every possible and truly laudable attempt to procure substitutes for tanning, either in lieu of or conjointly with oak bark, yet such has been the wonderful increase of our trade either foreign or domestic, that v eat breaks of timber I never yet m r dealer, who found any difficulty in s bark at an advance of price from year, and therefore it is fair to infer. and for that article has been at lea e with, if not superior to the supply.

Every body knows season for felling oak is generally confined to the spring, and to that particular part of it when the sap begins to flow. A series of cold winds or very hot weather will stop the circulation, and the bark will no longer run but with extreme labour and difficulty; this is therefore a period of great exertion on the part of the tan flawers, who work a vast many hours by task work. There is also a second season for falling timber, which, though contrary to Act of Parliament, 1 J. c. 20, is nevertheless sometimes practised, especially when from an untoward season or the want of hands, the buyer has not been able to get all his trees down in due time before the bark is set, and is at the same time under an engagement to clear off all the trees by a given or specified day, under the forfeiture of all such as may be left behind; in this case the buyer waits or a period after midsummer,* when the first rowth being as it were fixt, by I suppose, a parial stagnation of the sap, the tree begins to make second shoot, and the sap resumes its former, r makes a fresh circulation, and the bark which a ortnight or so before was firmly fixt, will (if a noist time particularly) again run with tolerable reedom.

I have often asked the tanners, if experimentally hey had discovered any difference in the bark vhich had been taken off at this second growth s to its tanning qualities, and I never could learn hat they had; in the first place, it is not usual vith the dealers to acquaint them with this fact, nd when they do know it, they generally put it long with the spring bark, and so it goes mixed nto the mill, and from thence into the vats; hey think it is inferior, and they will not if they an help it give so much a load for it; but not ven the best judges can tell the difference by handing and examining the bark.

The tanners say there is a law to prevent jobers dealing in bark. If such there be, I have not een able to find it in any of our statute books, ut I think there does not seem to be any chance n such a set of men succeeding in a monopoly so ong as the tanners are so rich, many of the timber

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[*] In the calender of Flora of Alex. Mal. Berger, published in 1755, it is said that the midsummer shoots of oak, beech, and lm, took place on the 28th of June; but that has not been the ase in England for several years, in 1803 it happened about the 8th of July, and in 1804 not till the 14th of July, according to he best observations I could make.

dealers not much so, and the loss in the weight very soon running away with any factitious rise in the price of the bark. The loss in the weight of bark is well known to all dealers; but I do not think they have any idea as to what extent, which may indeed partly be seen by referring to the bishop of Llandaff's very accurate experiments; and therefore we find them invariably sending their bark to the tanners, as fast almost, as it can be got ready for sale.

A few years ago the very best faggots were sold in every part of the southern division for 15*s.* to one pound per hundred, they are this season selling at 27*s.* and those not so good; nay, if my authority is well founded, and I have great reason to think it is, because I was indirectly consulted upon the matter by the commissary, the faggots (which are in every respect the same as are usually made up) which compose the fire-beacon on Sidlesfield common, were charged to government at 40*s.* per hundred, and the distance they were carried was not more than they were carried to individuals at 25*s.* Although this happened out of the county, yet as it is not, I believe, more than a mile or so, it proved an argument for the farmers or dealers to raise the price of them within the hundred of Reigate.

The same may be said of cord wood, which has risen within the last three years, from one guinea to 27*s.*; the rise in this article is principally owing to the great demand for charcoal, every thing, therefore, that is not wanted for manufacturing purposes is converted into what is called collier's ware, and in case of not selling for that, it is eagerly bought up by housekeepers in the neighbouring towns and villages.

The following Items will give some Idea of the Conversion and Value of Oak.

Oak standing with top, lop, and bark, according to its meetings and the quality, from £9 to £12. 12*s*.

Posts standing, 5 feet out of the ground, squared, from 6 to 8 inches, at 2*s*. 4*d*. each.

Posts standing, 6 feet out of the ground, squared, about 9 inches, at 2*s*. 10*d*.

Posts standing, 7 feet out of the ground, squared, about 10 inches, at 3*s*. 4*d*.

Aris rails for park or other fencing, about 10 feet in length, per pair, at 2*s*. 4*d*.

Slit, or rendered pales, 4 feet high, ditto 5 feet, ditto 6 feet, at 22*s*. per hundred, an allowance being made in the tale for the difference in the height.

Feather-edge plank for fencing, 1½ inch at top, and 8 inches wide, at 4½*d*. per foot.

2 inch plank, 3 inch ditto, 4 inch ditto, at 3*s*. 9*d*. per foot cube.

Cart or waggon spokes, 42*s*. per hundred.

Heart tiling laths, 3*s*. per bundle.

Sap ceiling laths, 1*s*. 6*d*. per bundle.

Park fencing.

Pales 5 and 5½ feet, 2 up and 3 down, 3 rails 1½ inch plank, 8 inch wide, 37*s*. per rod.

Pales 5 feet, straight top, 2 railes, 8 inch plank, 32*s.* per rod.

Pales 5½ and 6 feet, 2 up and 3 down, 3 rails and plank, 40*s.* per rod.

Pales 6 feet, straight top, 2 rails and plank, 39*s.* per rod.

Pales 4 feet and nd 3 down, 2 rails and plank, 28*s.*

N. B. The include the putting-up.

Bark cut and vered in, £30 per load.

Ditto in the r g, at 20*d.* to 22*d.* per yard, or fro to £4 per rod, 40 of which make

Cord wood a delivered two or three miles, 27*s.* per hundred.

Sawing of plank out into any scantling, at 3*s.* 6*d.* per hundred feet run.

An eminent timber merchant has this spring, 1805, sold one oak tree for one hundred guineas.

Note. All the various scantlings have increased with the price of round timber, these prices were calculated in 1803.—Timber then from £7 to £9. 9*s.* per load.

By the 1st and 2d Philip and Mary, no person shall carry any wood out of the kingdom, on pain that the owner of the ship shall forfeit the ship and tackle; the owner of the wood, double the value of the wood, and the master and mariners all their goods, and be imprisoned for a year.

I had nearly forgot to mention a circumstance respecting the timber that is grown in the hundreds of Tanridge and Reigate, which I never met with in any oak in any other part of this county, or indeed in any other county in the kingdom; which is, that instead of the grain of the wood running in nearly parallel lines with the bark, it runs in a more transverse direction.* I was accidentally led to this discovery, by taking shelter under the roof of a saw-pit, where a very fine tree was sawing into large plank. I observed that the sawyers laboured very hard, and the saw made a noise as if they were cutting through nails, when the men told me they were cutting against the grain, and that it was common with a great part of the Surrey timber, but particularly in those two hundreds; that they [illegible] like instance in Kent, Essex, [illegible] o which counties they always g [illegible] d finished at that place, and they we [illegible] x-pence to one shilling per 100 fe [illegible] g this timber than they had at e [illegible] aces. By sawing with the grain [illegible] be much lighter and easier than w [illegible] its it either across the grain directly in the centre of it, or in a more diagonal direction.

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* Since I wrote the above, the subject has frequently occurred to me, and no occasion has been lost that would supply me with any insight into the matter; and the following ideas have resulted therefrom. I think it very probable that oak acquires these different modes of growth from the different strata through which it passes. In the soil which characterises these hundreds, is not only to be found large and frequent beds of sand-stone, but also many parts of it abound in iron-stone charged with vitriolic matter; the tap-root, therefore, in descending, is obliged to make choice of some circuitous or zigzag passage in order to find out its proper food. My observations have been sufficiently numerous to satisfy me that this may be one, if not the principal cause, since where the soil is of sufficient depth and quality, the plants grow cleaner and straighter, because the roots pass in the same direction without meeting with any obstruction; on the other hand, the trees, whose roots take these curvilinear directions, cause the sap to flow in the same irregular manner, the sinews become, in consequence, contorted and spirally united, and produces that toughness and hardiness peculiar to those trees, or as the immortal bard expresses it,

Thou rather with thy sharp, and sulph'rous bolt,
Split'st the *unwedgeable*, and *gnarled* oak,
Than the soft myrtle——

And again Sidonius in his panegyric,

—— Quercus que tropæis
Curva gemit ——
The bended oak beneath the trophies groans.

The oak was considered by the ancients as the most proper tree for carrying trophies, on account of its stateliness and strength, thus Virgil:

A stately oak, whose branches all around
Were first lopt off, he placed on rising ground.
Æneid XI, v. 4.

I shall not pretend to account for this phenomenon at present, but I have great reason to think that it is peculiar to this part of the county, for I have seen a great deal of timber which came out of St. Leonard's forest in Sussex, which was sawed up while I was present, where the grain was essentially different, and also a great deal belonging to one of our first timber dealers at Edenbridge, where the timber had been brought from the neighbourhood of Hever Castle, in Kent, and the grain had no resemblance, nor was the wood nearly so hard, as I have often proved with different pieces with my knife. I am inclined to think that all such timber is much heavier; but I never tried it, as I could not get a proper piece for an experiment, without injuring the plank. It is generally understood that hedge-row timber is much closer grained and heavier than that which grows in woods, but most of that which I am speaking of, and particularly the one that was sawing when I made the discovery had grown in a wood, in which place indeed it was converting.

In felling of timber I do not think our people are sufficiently careful in disbranching such of the limbs as may endanger it in its fall; some of those very fine trees in Burstow were much injured by this want of attention. The large arms in some of them were cut off at various distances from the bole, and when they fell, they came down upon some of these stumps with no small force, which produced a violent rend and fracture. They should always have those limbs chopped on the under side close to the bole, and then on the upper side to meet it with clean down-right strokes, by which means the arm will be severed from the tree without splitting or injury; this is no trifling object to the merchant who always finds himself sufficiently plundered in other ways, without this additional one arising either from ignorance or inattention.

Having taken notice of Mr. Forsyth's observations on the diseases, &c. of forest trees, a few extracts from his work may not be unacceptable in this place; and I shall not hesitate to introduce them as I have his permission for it.

On the Management of Forest Trees.

"The received opinion and common practice of most professional men has been, to prune or lop their trees from the month of October, when the juices have been exhausted by the summer foliage, autumnal fruit, and general nourishment of the body of the trees, until the month of March, when the sap and juices, reinvigorated by nature during the winter's repose, begin to reascend and perform the annual function of cloathing it with fresh foliage, blossoms, and fruit. The reason of this practice is, that the sap being fallen at that season of the year, it has been considered as the most proper period to lop off all superfluous branches or growths; and the efforts of nature to heal the wounds thus necessarily given, (before the rising of the sap in the spring) have been judged best for the safety and health of the tree. The danger of performing this service when the juices are in a more vigorous flow, as in the months of May, June, and July, has been dreaded, from a fear of its occasioning a waste of the nutritive juices, discharging themselves through the wound, to the impoverishment and injury, if not the ruin, of the tree.

"The pruning of fruit trees, and the lopping off large branches from forest trees during the winter season, has also been frequently attended with great hurt and impediment to their health and vegetation; the wounds being exposed to all the rigours of an inclement season, and thereby contracting those diseases which contain the principles of decay. Hence it is that such numbers of forest trees are continually injured in their value for public uses, either by unskilful management or purposed depredation, or by the violence of boisterous winds, when their limbs and branches being torn off, the trees are left in that unprotected state to imbibe the seeds of decay and rottenness, which will in time pervade their very heart, and render them unfit for any of those valuable purposes for which nature, by their frame and texture, appears to have designed them.

" It may also be observed, that where branches have been cut off from the body of the tree, even at the distance of two or more feet from the trunk, with a view to prevent injury to the timber, even that method has not been found effectual to save the tree from very material detriment; as the remaining stem of the branch so cut away, dying soon after, becomes a ready conduit for conveying pernicious moisture and disease to the part of the tree with which it is connected, and so on, in time, to the whole.

" The practice of others, in lopping their trees close to the trunk, and dressing the part smooth and even, has fewer objections than the former; nevertheless, even according to this method, the tree is liable to injury. The effort of nature to heal the wounds thus given discovers itself by encircling the wound with a kind of callus or lip, which increasing in size, and swelling out from the annual flow of the juices, forms a hollow or cavity of the central part, where the rain or snow is very apt to lodge; and penetrating between the bark and the wood, dried and cracked by a hard frost or a warm sun, promotes that fermentation with the natural juices which is the certain source of disease and decay.

"Young, healthful, and vigorous trees, when they have been injured by being wantonly cut through the bark, or from other causes, will sometimes recover themselves, and, to all outward appearance, be restored to their original soundness; but when cut into planks and boards, internal blemishes and faults are discovered in them, which appear to have been occasioned by the early injuries which the tree had received; the texture of the wood not uniting where the wound was originally given; though from the youthful vigour of nature the bark has closed, and an external cure has been evidently performed.

"As a most efficacious remedy to prevent the evils that I have described, with all their destructive consequences, and to restore sound timber where the symptoms of decay are already apparent, I confidently recommend the use of my composition, which, being applied in a proper manner to the wounded or injured part, will infallibly prevent the bleeding of trees, or the oozing of juices through the wounds of limbs or branches that have been cut off in the middle of summer, when they are in the highest vigour, and most rapid flow of vegetation: by which means any wasteful discharge of the juices is prevented, and they are duly confined to their natural operations of giving nourishment, growth, and fertility to their respective bodies.

"By employing the proposed remedy, trees of all kinds, whether in gardens or orchards, in parks or forests, may with greater safety and advantage be pruned or lopped in the spring, or early in the summer, than in the winter season; as the composition, when properly applied, repels the flow of the juices through the wound, causes a more active vegetation, and assists nature more powerfully in healing the wound at the time the sap is in full vigour, than when it is on the decline, as in autumn and winter.

"It is also necessary to remark, that both fruit and forest trees (particularly those which grow in the shade) are very liable to be affected with disorders proceeding from the growth of liverwort, and various kinds of moss that adhere to the outer bark of the tree, and frequently gain a considerable thickness, that not only prevents the natural flow of the juices, but causes a stagnation in the circulation, and brings on decay; which, after destroying the outer bark, penetrates, by degrees, deeper into the wood. Where this circumstance is observed, care should be taken to clear the whole bark of the tree from these growths; and where it is infected, to scrape and pare it away. When the body of the tree is thus cleansed from infection, the composition should be applied, in a liquid state, to the parts so cleansed, to close the pores of the wood: when the tree will soon acquire a fresh bark, with improved health and vegetation. I am confirmed in these opinions by the many experiments and various trials that I have made to ascertain by the most positive proofs, the properties of this composition, before I ventured to offer it to the public attention.

"Of oak, ash, limes, elms, chesnuts, and sycamores, as well as the tribe of firs and pine, which have received very considerable damage from various accidents, as blows, bruises, and cutting of deep letters, the rubbing off of the bark by the ends of rollers of wheels of carts, and mutilated branches, a perfect cure has been made, and sound timber produced. The acidity, or corrosive quality of the juice of [illegible] hen obstructed in their circulation fron [illegible] e causes already mentioned, and fe [illegible] the wet and moisture imbibed by th [illegible] n the atmosphere, will bring on disease [illegible] ote decay.* For, notwithstanding tl [illegible] ture of the oak, when once the princ [illegible] begin to operate, the acrimonious j [illegible] disease, and accelerate its progress, as much, perhaps, as in trees of a softer quality and texture; but when the diseased or injured part is entirely cut away to the fresh sound wood, and the composition properly laid on, as perfect a cure has been made as could be desired."

I beg leave to recommend to the particular attention of the landed proprietors throughout the kingdom, that all forest trees, whether felled with a saw or an axe, may be cut near to the ground; at the same time carefully preserving the stump and roots from any further injury. The surface should then be made quite smooth, when the composition may be spread over the whole surface according to the directions. It should, however, be observed, that the composition, when employed for this particular purpose should have an equal quantity of the powder of alabaster mixed with the dry powder generally directed to be used after the composition is laid on, in order to render the surface harder, and of course better able to resist the bad effects of the dripping of trees, of rain, frost and snow. But this addition is by no means necessary in the usual application to the sides of trees.

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* Statius, the Roman poet in the Thebaid, has these words:

Quercus erat teneræ jamdudum oblita juventæ,
Huic leves galeas, perfossaque vulnere crebro
Inserit arma.

There stood an ancient oak, whose sprightly juice
Decayed by age, could not like life infuse
Thro' ev'ry part; on this bright helmets hung,
And batter'd arms.

J. M.

In consequence of this process, the vigour of the roots will operate so powerfully in the course of the succeeding spring, that a considerable number of buds or branches will shoot forth round the stump, which, with proper care and attention, may be trained to many valuable purposes, either straight or crooked; for knee-timber, or other uses; and by retaining only so many of these shoots as are designed to grow for any particular intention, more than one half will be saved, in point of time, according to the proportions of common growth: for, if a young tree be planted in a soil equal in quality to the site of the old stump, the shoots growing from the latter, will, in eight or ten years, attain to a size which the single plant will hardly acquire in twice that period. There are also many useful purposes of husbandry, as hop poles, and other poles used on various occasions, for which a number of shoots may be trained from one stump, whose fertile juices will shortly rear a healthy and numerous offspring around it. Very particular attention, however, should be paid to regulate their number, according to the size and vigour of the stump. It certainly would be proper to leave more of them at first than are intended to be reserved for final use, in order to draw up the sap; if too few ar ill be liable to burst, from the supe of the juices from the old stock; to h inconvenience, they should be cu rees, always applying the compositi cut, and leaving the finest stem to p ew tree, which will in time cover the d leave nothing but a faint kind of e junction of the old and new part of the tree. It is needless for me to insist on the great advantages which land-proprietors and farmers will derive from this method of managing their woods and coppice grounds, wherever they may be. In many counties of England, coppice or underwood, is an article in very great demand for charcoal, common fuel, or the purposes of particular manufactories, as well as to furnish a variety of articles for husbandry and domestic convenience.

Directions for making Mr. Forsyth's Composition for curing the Diseases, Defects, and Injuries in all kinds of Fruit and Forest Trees, and the Method of preparing the Trees and laying on the Composition.

"Take one bushel of fresh cow dung, half a bushel of lime rubbish of old buildings (that from the ceilings of rooms is preferable,) half a bushel of wood ashes, and a sixteenth part of a bushel of pit or river sand: the last three articles are to be sifted fine before they are mixed; then work them well together with a spade, and afterwards with a wooden beater, until the stuff is very smooth, like fine plaster used for the ceilings of rooms.

The composition being thus made, care must be taken to prepare the tree properly for the application, by cutting away all the dead, decayed, and injured part, till you come to the fresh, sound wood, leaving the surface of the wood very smooth, and rounding off the edges of the bark with a draw-knife or other instrument, perfectly smooth, which must be particularly attended to; then lay on the plaster about one-eighth of an inch thick, all over the part where the wood or bark has been so cut away, finishing off the edges as thin as possible: then take a quantity of dry powder of wood ashes, mixed with a sixth part of the same quantity of the ashes of burnt bones; put it into a tin box with holes in the top, and shake the powder on the surface of the plaster, till the whole is covered over with it, letting it remain for half an hour to absorb the moisture; then apply more powder, rubbing it on gently with the hand, and repeating the application of the powder till the whole plaster becomes a dry smooth surface. And for trees cut down near the ground, to the dry powder just mentioned, an equal quantity of powder of alabaster must be added.

“ If any of the composition be left for a future occasion, it should be kept in a tub, or other vessel, and urine of any kind poured on it, so as to cover the surface; otherwise the atmosphere will greatly hurt the efficacy of the application.

"Where lime rubbish of old buildings cannot be got easily, take pounded chalk or common lime, after having been slaked a month at least. As the growth of the tree will gradually affect the plaster, by raising its edges next the bark, care should be taken, where to rub it over with the finger when equire, (which is best done when n ain,) that the plaster may be kept event the air and wet from penetra ound.

"To the fo ons for making and applying the co s necessary to add the following. A of using the composition is found by experience, to be in a liquid state; it must, therefore, be reduced to the consistence of a pretty thick paint, by mixing it up with a sufficient quantity of urine and soap-suds, and laid on with a painter's brush; the powder of wood ashes and burnt bones is to be applied as before directed, patting it down with the hand.

"When trees are become hollow, you must scrape out all the rotten, loose, and dead parts of the trunk, till you come to the solid wood, leaving the surface smooth; then cover the hollow and even part where the canker has been cut out, or branches lopped off, with the composition; and, as the edges grow, take care not to let the new wood come in contact with the dead, part of which it may be sometimes necessary to leave; but cut out the old dead wood as the new advances, keeping a hollow between them, to allow the new wood room to extend itself, and thereby fill up the cavity, which it will do in time, so as to make as it were a new tree. If the cavity be large, you may cut away as much at one operation as will be sufficient for three years. But in this you are to be guided by the size of the wound, and other circumstances. When the new wood, advancing from both sides of the wound, has almost met, cut off the bark from both the edges, that the solid wood may join, which, if properly managed, it will do, leaving only a slight seam in the bark. If the tree be very much decayed, do not cut away all the dead wood at once, which would weaken the tree too much, if a standard, and endanger its being blown down by the wind. It will, therefore, be necessary to leave part of the dead wood, at first, to strengthen the tree, and to cut it out by degrees as the new wood is formed. If there be any canker, or gum oozing, the infected parts must be pared off, or cut off with a proper instrument. When the stem is very much decayed, and hollow, it will be necessary to open the ground and examine the roots, which if cankered or injured must be cut away.

If an oak or an elm has been much bruised, and the bark is bound, shave off all the cankery part with a draw knife, and scarify the tree in as many places as may be necessary, then apply the composition with a painter's brush over the wounds, shaking the powder of wood ashes and burnt bones all over it."

Mr. Forsyth has sufficiently proved that when an oak loses its tap-root in transplanting, which in fact is usually cut off, it always produces fresh tap-roots and makes a finer tree in half the time than trees not transplanted. See page 470.

Another composition which has been used by Mr. Smith, and has succeeded extremely well in Kent, is, to mix two pounds of powdered free chalk with one quart of tar, and lay it very smooth on the wound, and of a moderate thickness; it should be now amined, and any deficiences suppli of the dressing, but in general it any, and the wound presently heals

ns.

In a county n soil appears so singularly favourable to the growth of timber and underwood, and more particularly on the side of that ridge of hills to the southward, which I have so often alluded to, it will not be surprising that the much greater portion of such land should have been employed in the cultivation of so necessary an article, especially if we consider that pit-coal was formerly scarcely so much as known in these parts, that there were large iron founderies in the parish of Godstone, &c. and that the only fuel with which those furnaces were supplied, was this wood, of which many families burn nothing else to this day; notwithstanding it is admitted by those who are obliged to buy, that coals, since the introduction of water carriage, the improvement of the roads, and the great increase of traffic thereon, make in the end a much cheaper fire. I have sufficiently proved this fact since I have resided at East Grintead during the last two years, where, notwithtanding we have 30 miles of land carriage to pay n addition to the prime cost of the coals, they are heaper than cord wood at its present price deivered in. I shall endeavour in the course of my bservations to explain the reasons for its being so.

That this county was formerly almost one entire vood, at least between the hill and the extremity f the county, is very evident from many concomiant circumstances; first, that it was very thinly nhabited, although the much greater part of it s inclosed, and it is even so to this day, notwithtanding the farms are in general very small; seondly, that little more corn was grown than was qual to the consumption of their respective arishes or neighbourhoods, and in wet seasons hey were obliged to buy from other quarters; hirdly, that many stumps or roots of very large rees have been occasionally found dispersed about ields that are now under the plough; fourthly, the prevalence every where of shaws entirely round ome fields, in others on one or two sides, but corresponding with, and as it were being a continuaion of the same shaw, and as if they had been eft when the ground was cleared; and lastly, that many woods have been actually stocked up, cleared, and converted into tillage within the memory of man.

When this part of the county was so thinly inhabited as I have described, and before the conversion of wood into charcoal, it appears that the only demand for it was, the ash for hoops, the alder for pattens and gunpowder, and the birch, maple, hazle, and oak for fuel; and of so little value was an acre of this wood, that they could afford to carry it to London, although from the badness of the roads, it took them the greater part of a week to go there and return.

As population increased, and the necessity for supplying that population with corn and animal food could not be dispensed with; and seeing that the price of both were daily rising, while that of underwoods was still at a stand, it became an object with proprietors to exert themselves to render their estates more productive, especially as the return from an acre of underwood was distant, while that from corn was present, notwithstanding it was subject to none of the vicissitudes or casualties of the latter; yet when they found in other parts that the latter was also paying the grower from £7 to £10 per cent, when the best underwood would not pay more than £3, it became no longer a subject of hesitation, but a matter of prudence and sound policy to open the country by destroying and stocking up the wood.

This being followed up from time to time, as occasion or opportunity presented itself, it is not to be wondered at, if in our days, the value of underwood has increased, and within a few years nearly cent per cent, partly owing to the increasing scarcity, and partly to the multiplied ways of disposing of it. Still, however, a great deal is left, and it shall be my business to give an account of the management of it, the uses it is severally applied to, and lastly its value.

And first, it is the practice in some places to lay out the wood in such a manner as that a certain number of acres shall be cut annually; that is, in a copse of 40 or 100 acres, the whole of it may be cut twice in the course of a lease of 21 years; but then unless the quality of the soil is such as to ensure a rapid growth, the wood must be small, having made but little more than 10 years growth; its value then, may be from £14 to £16 per acre, depending upon the sort of wood that is contained in the copse; the best ash, alder and beech are converted into hoops; maple, oak, birch, elm, &c. of inferior quality and growth, are sold for poles for the younger plantations of hops, which sell at the rate of from 12*s.* to 15*s.* per 100, of 12 feet height; those from 14 to 16 feet at 21*s.* per 100 in the wood. The hazle is often converted into hurdles which sell from 10*s.* to 12*s.* per dozen, the refuse of each being made into faggots; these if good, are worth from 14*s.* to 20*s.* per 100 in the wood. Kiln faggots, which are the spray, are sold at 7*s.* per 100 in the wood. Alder copses are worth from £5. 10*s.* to £7 per acre. Five slat wattles at from 40*s.* to 42*s.* per dozen.

Fourteen years are, however, the more usual periods of cutting, and then every thing is supposed to arrive at a good marketable size; upon favourable land, such underwood will fetch according to its stock, from £16 to £25 per acre, because it is not only fit for colliers ware, for charcoal burning; but for the best hoops, and for the oldest hop plantations.

The mode of their burning it into charcoal is as follows: when the wood is cut into faggots, it is brought to the place to be burnt, which is generally chosen in a low damp situation; the pile is then made in the following manner: the hole in the middle fill with straw, then placing wood and faggots all round, to the diameter of 12 or 14 feet; you put on the top of this pile more straw, and t [illegible] nore faggots upon the pile in the [illegible] as in the foundation, filling the se [illegible] with straw, and making the up [illegible] e pile as large as the foundation, [illegible] r the whole a layer of damp tu [illegible] mould, in order that the fire may [illegible] t not burn. The pile being thus a [illegible] straw in the lower hole is lighted, and it is carefully attended to during ignition, to keep the fire alive, and to give vent to the smoke by a number of small holes pierced into the covering. If the wood intended to be burnt into charcoal, consists in a great measure of oak or beech, as sometimes happens where timber has been felled, it is not made into faggots, but into cords of 16½ feet long, 4 feet high, and 3 feet broad. Eleven cords are made into a pile, and that will require two days and two nights to burn. The expences may be thus calculated.

To 50 cords of wood at 15*s.*	£37	10	0
Burning 315 sacks of charcoal at 4*d.* per sack..........................	5	5	0
Carrying ditto at 4*d*.................	5	5	0
Carried over.	£48	0	0

Brought over.	£48	0	0
Preparing the wood and piling it is included in the carrying and burning, usually 2*s* 6*d*. per cord.			
Wear and tear of sacks, loading and beer..........................	4	14	6
Wood house for the burner about......	0	10	6
	£53	5	0
Contra.			
By 315 sacks of charcoal of 5 bushels, at 5*s*. per sack.....................	£73	15	0
Deduct expences.....	51	5	0
	£25	10	0
From which we are to deduct the carriage to London, at four journeys, at 42*s*. per journey..................	8	8	0
Leaves a profit for risk and trouble of...	£17	2	0

Sixty sacks constitute a load, but our waggons, being generally drawn by five or six horses, and with 9 or 14 inch wheels, carry from 80 to 100 or more sacks per load, according to the situation of the country and the state of the roads.

The best coal is made from the large wood of oak, chesnut, birch, ash, and beech; the next best is from alder, hazle, willow, and sallow, but the small of these are found to be too soft for the purpose.

The burning of charcoal is a profession that requires no common degree of skill and attention, as I shall shew in a few words. When the pile, con-

structed agreeable to the usual method pursued in this part of the country, which I have before detailed, is set on fire, part of the oil of the wood, says the bishop of Llandaff, is consumed during the burning of the pile; the other part, together with the air and water contained in the wood, is evaporated, a
ns when the operation is finished the e
he wood, called in that state, charcoal
naking of charcoal is a kind of dis
he coating which surrounds the
may be compared to the retort.

In making
workmen observe that the pile of w
y diminished in size by the operation;
ds from the sinking of the wood. This diminution not only depends upon the nature of the wood, but it is influenced by the strength and continuance of the heat, that being most diminished which has sustained the greatest heat. When charcoal is burned in small quantities, and in a slow fire, less of its substance will be dispersed into the air than when the quantity is larger, and the stream of air which supports the fire is more rapid. Again, the stronger the fire, the less is the quantity of charcoal which a definite weight of wood will yield. It seems, therefore, to be matter of the first consequence in the burning of charcoal either for the laboratory, the manufactory, or for making of gunpowder, that great attention should be paid to its process, because it seems not improbable, that if the weight of the ashes remaining from the burning of a definite weight of charcoal, be at all influenced by the degree of fire, it seems reasonable to suppose,

that what is driven off by the violence of the fire, is of the same earthy nature as that which remains when the fire is more moderate; at least it may be argued, that when charcoal is burned with a slow fire, some of its principles, (its oily principle for instance, though it probably also contains a saline one,) are more completely decomposed than when it is consumed with a violent fire, and that the decomposition of these principles gives an additional quantity of earth or salt to the ashes.

Chaptal in his Elements of Chemistry says, “the art of charring of wood, or converting it into charcoal, is an operation nearly similar to the distillation of plants by a naked fire. It consists in forming pyramids of wood, or cones truncated at their summit. The whole is covered with earth, well beaten, leaving a lower and upper aperture. The mass is then set on fire, and when the whole is well ignited, the combustion is stopped by closing the apertures through which the current of air passed. By this means the water, the oil, and all the principles of the vegetable are dissipated, except the fibre. The wood in this operation loses three-fourths of its weight, and one-fourth of its bulk. According to Fontana and Morozzo it absorbs air and water as it cools. I am assured, from my experiments in the large way, that pit coal desulphurated (coaked) acquires 25 pounds of water in the quintal by cooling; but the coal of wood did not appear to me to absorb more than 15 or 20. The suturbrand of the Icelanders is nothing but wood converted into charcoal by the lava which has surrounded it. See Van Troil's Letters on Iceland.

"The charcoal which is the residue of all these distillations, is a substance which deserves the attention more particularly, because it enters into the composition of many bodies, and bears a very great part in their phænomena.

"Charcoal is the vegetable fibre very slightly changed. It most commonly preserves the form of the vegetable which afforded it. The primitive texture is not only distinguishable, but serves likewise to indicate the state and nature of the vegetable which has afforded it. It is sometimes light, spongy, and friable; and some substances afford it in a subtle powder, without consistence. The coal of oils and resins is of this nature.

"Charcoal well made has neither smell nor taste; and it is one of the most indecomposable substances we are acquainted with.

"When dry, it is not changed by distillation in close vessels. But when moist it affords hydrogenous gas, and carbonic acid; which proves the decomposition of the water, and the combination of one of its principles with the charcoal, while the other is dissipated. By successively moistening and distilling charcoal, it may be totally destroyed.

"Charcoal combines with oxygen, and forms the carbonic acid; but this combination does not take place unless their action be assisted by heat. The charcoal, which burns in a chafing-dish, exhibits this result, and we perceive two very immediate effects in this operation; first, a disengagement of heat afforded by the transition of the oxygenous gas to the concrete state; second, a production of carbonic acid; it is the formation of this acid gas which renders it dangerous to burn charcoal in places where the current of air is not sufficiently rapid to carry off the carbonic acid as it is formed.*

"The nitric acid, when concentrated, is decomposed with much greater rapidity, for if it be poured upon very dry powder of charcoal, it sets it on fire. This inflammation may be facilitated by heating the charcoal or the acid. If the fluid which arises in this experiment be collected, it is found to be carbonic acid, nitrous gas, and nitric acid.

"Charcoal mixed with the sulphuric and nitric salts, decomposes them; when combined with oxides it revives the metals. All these effects depend on its very great affinity with the oxygen contained in these bodies. It is used to facilitate the decomposition of saltpetre in some cases, as in the composition of gunpowder, the black flux, &c.

"Charcoal is likewise capable of combining with metals. It combines with iron in its first fusion, and mixes with it likewise in the cementation by which steel is formed. When combined with iron in a small proportion of the metal, it constitutes plumbago. It is likewise capable of combining with tin by cementation, to which metal it gives a brilliancy and hardness."

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* How many instances do we frequently hear of persons having been found dead where charcoal has been used in brasiers to air rooms, or rather to carry off damps from having been long shut up, or very recently plastered and painted, without proper ventilation having been afterwards used.

From this induction we may see how necessary it is for our colliers to have a thorough skill and dexterity in the burning of charcoal, for on the proper management of it must depend to a certain degree the quality of the manufacture in which it is used, and if that is so indispensable, how much more attentive c be to the quality, as well as the sor t is to be charred.

Having thus ue of underwood in the south east p unty, I have only to add on that head ortion as it advances more westerly it ewhat more in value, owing to its a e rivers, &c. which reduce the pric and it finds a more ready sale in co reof. But notwithstanding I have not been able to find out any period where the supply exceeded the demand for the last ten or twenty years, so as to affect the price seriously in the market; but on the contrary, that there are always an abundance of chapmen and dealers ready to buy, let the quantity on sale be what it may, yet, it does not appear to me that any or at least very little attention is paid to those underwoods after a fall or cutting, except making as slight a dead hedge as possible, by which means at the latter end of the first or second year, while the leaves are yet green, the buds fresh, and a scarcity of pasture prevails, cattle oftentimes get in, and do an irremediable deal of mischief, which perhaps is not discovered by the tenant or woodman for a great length of time, when chance leading him that way he finds that the stools look sickly, and have made no progress, that they have been broused by the cattle, and probably covered with wool, (in a certain degree,) which is very injurious from his own or his neighbours sheep; nor is this the only evil attending the miserable plight of many underwoods, for in addition to the damage done by cattle, it is inconceivable how much is also done by men who call themselves sportsmen, and who rather than lose a bird or a hare, let fly amid the best or the worst as it may happen of this young stuff, wounding and lacerating the shoots in such a manner as effectually to check their further growth.

Independent of these accidents, whether negligent or not, it is not to be denied but plants and trees will sometimes fail even in the most favoured soils, but when they are neglected, and the soil not genial, or the stools worn out, where do you find a landlord, much less a tenant, repair? During the latter five or six years of my life, in which time my employments have given me such repeated opportunities of making observations, I scarcely know of a place where old worn out stools have been grubbed up, and young plants put in their room, or vacancies filled up by any other means; but the whole is left to chance, to be over-run with brambles, briars, thistles, docks, sedge, rushes, and I know not what trumpery; neither is the slightest attention paid to keep the ground dry, whatever may be the declension of the land, but whoever passes through them, either on horseback or on foot during the winter months, runs frequently the chance of being bogged; as if it is not as necessary to keep underwoods dry, as to keep corn land dry, since there is always wet land enough for aquatics, which are the least valuable part of the wood. I must, however, except from this charge my friend Saunders, and a few other respectable men; he particularly, because he shewed me what I could scarcely have believed, that it is possible to replenish an underwood by plashing trees as thick as ones wrist, and making a stool from almost every joint, supposing the plasher to be 12 or 16 feet long; an underwood so treated may be made to fill up every vacancy, and the shoots from these layers or plashers will be infinitely stronger than from any fresh planted tree, and will presently out-top those from the old stools.

His mode of doing it is very simple, he cuts with a sharp bill the shoot intended to be laid close to the ground, and about half through, he then bends the shoot which he calls the plasher to the ground, which he secures there with strong pegs or hooked sticks, at every joint he makes a longitudinal gash or cut with a sharp knife, and then lays a little fine mould upon it, and lastly lays some turf upon it; from each joint will spring up from five to ten shoots and more in a kind soil, which I have seen grow six feet the first season, and at each joint the plasher will take root: these are suffered to grow attached to the parent stool for two or three years, and as the plasher will in the course of that time be firmly established and rooted, it is then effectually dismembered, not only from the parent stool, but every distinct joint being now become a distinct stool, they are separated from each other; thus a copse may be speedily repaired in a very effectual way at an easy and certain rate; but it is deemed not only clean husbandry, but as tending very much to the encouragement of the young stools to keep them free from weeds and briars, and also to add some fresh mould among the shoots the first and second winter. Ash, alder, sallow, willow, maple, and chesnut are the sorts which take root the quickest, particularly the first four; the two latter, and oaks, requiring a much longer time to establish themselves.

The manner of keeping the woodlands in almost every part of the county appears to me extremely reprehensible. When a fall is taking place it is natural to suppose that the woodman would set out, the freest, straightest, and best oaks as a succession to the full number conditioned by the lease, or by the conditions of sale (most of the underwoods being in the hands of the proprietors, and when they are judged to be fit for cutting they are sold by auction) provided to be left; on the contrary, however, we see them often cutting down the best, and leaving the seconds and inferior ones, paying no regard to regularity of distance, but they are left as chance or whim directs; perhaps also the woodman wants a few tall straight sticks for rails, rafters, hurdles, &c. in that case he is careful not to take the worst trees in the copse, but he sometimes takes the very best; and should this wood be at a distance from the residence of the proprietor or his agent, there is no chance of safety for it; if on the other hand he resides in the neighbourhood then there is no end to the disputes and wrangles between the parties.

As one proof among many of the mismanagement of underwoods, and in confirmation of what I have just advanced, I saw last winter between Horley and Reigate, as fine a copse as could grow; it was of 18 years growth, with almost every sapling cut down; the damage done to the estate was almost incalculable, for by the time another cutting would take place, say 14 years at the soonest, these trees would be 32 years of age, consequently would not only be telling as timber, but would be out of all danger from accidents by cattle, &c. What remuneration could be made to a proprietor for such a serious injury?

It is not the mere saving of saplings, filling up vacancies, and securing the boundaries by strong fences, &c. that requires much to be attended to; attention must be paid to the season of the year when it is cut, not a little to the manner of cutting it, and finally in having it cut when from any causes of untoward seasons, or from accidents, the growth appears stagnant, for it would be folly in the extreme to let that stand over for 10, 12, or 14 years, when its growth is completely checked or retarded at four, five, or six; all this must or ought to be left to the discretion of men of competent skill and judgment, and not to London or country attorneys, who can know nothing of such matters.

The next injury that an estate suffers, especially round the boundaries of copses and fields, is that of annually pollarding as many of the young trees as can consistently be done. I have always been so great an enemy to this abominable practice, that under no circumstance whatever would I permit it; indeed Mr. Middleton's mode of taking them all up, and disposing of them for the benefit of the landlord at the expiration of a lease, is one of the most likely means of preventing further injury to the young trees. I have often thought that if a tenant had an interest in all timber trees upon his farm, it might be an inducement for him not only to take care of them, but to assist their growth by a sort of cultivation. It might, I think, be done by something like the following mode. For example, suppose a farmer upon his entrance into his farm, in addition to the valuation of the underwood, hedges, and the like, which make a part of his annual crop, the timber trees and saplings were also to be valued to him; but without having any power to cut down or sell at the expiration of his lease these and all fresh or young trees that he may have raised or protected, should be valued, and a certain portion of the profit or improved value, as might be agreed upon, should be paid to him. I know but of one objection to the measure, which is, that at present whatever timber is growing according to the present system upon a farm, is thought to be all clear gain to the landlord, whereas upon my plan there could be a certain drawback, or in other words, the improved value would from time to time be divided between landlord and tenant; this objection, however, has but little weight, for how many trees does the farmer let stand now? not one more than he can help. He says, and with some truth, I am paying rent for the ground that these trees are growing upon, I am not allowed any thing for their growing there, I should pay no more rent if they were all cut down; but he may think also that these trees do him a great deal of harm, and therefore having no interest in them, it is rather his interest to get rid of them and to prevent any young ones from springing up. Now, I do declare that this is no conjecture of mine, for when I was a farmer, and could talk freely with my neighbours upon the scarcity of wood upon their farms, without their suspecting me of taking advantage of such their declarations, their uniform language was such as I have just described, with this addition, that as all trees more or less injure their hedges by the drip from them, and their corn and grass by their shade, they made a rule of ploughing as close to the roots as they could, of undermining and damaging their roots in the ditches, and boring holes into the stem, or giving it every now and then a stroke with the hedgebill at a time of the year when the sap was flowing freely, in order by profuse bleeding to produce an early and inevitable decay. But give them an interest in the trees on their farm, however small, and I will venture to say that there would be no pollarding, and that where there is one tree now, there would probably be 50 generally speaking, and we may be sure even then that the farmer would not let there be too many trees to injure his other crops; he would in fact consider this as one of them, and instead of mangling and underhandedly destroying, we should find him planting, securing, and nourishing them. Again let it be considered in the light of the wholesale and retail dealer, the former, by means of a large capital, and the gross quantity of goods which he sells, is satisfied with a very small profit indeed, because, by giving very short credit, and his returns being quick, and frequently repeated within the twelvemonth, he is enabled to realize at the expiration a sufficient gain; the retail dealer makes however a larger profit upon the same goods, with a smaller capital; but giving longer and uncertain credit, his gains at the end of the same period are not so much in proportion as the wholesale dealer. So it would be with the landlord and tenant. Ten trees at a certain age and growth, supposed to be now upon a farm, may be worth £50, but 50 trees of a less age, after deducting the farmer's charges and interest, may return nearly to the owner 40*s.* per tree, and which may stand upon the same extent of land as the former 10 trees, this would therefore produce a gain to the lord of the soil of £50, so that each party would be gainers, and the public better supplied with wood and fuel; and I am sure that in this, as in every thing else, unless there is a reciprocity of interest, instead of its being all on one side of the question, the system can never be good; it must, on the contrary, be very defective.

I have somewhere said, that there is a very striking and visible decay apparent in many of the large underwoods in the county. In the parishes of Lingfield and Crowhurst, particularly the former, there were some woods that produced within the last 20 years some of the finest timber, and in the greatest abundance that could be grown, and the underwood was in every sense corresponding; but since almost the whole of these fine trees have been cut down, and the woods laid open, all the young timber and tellers have received such a surprising check, that they never can recover; indeed it is almost impossible to find a clean, thriving tree among them, while the stools in the underwoods die away, leaving vacancies of from one to more rods square, a [illegible] ich do grow, do not make so much [illegible] 14 years as they had used to do in [illegible] colliers-ware of an inferior quality. [illegible] ch land in underwood longer is sur [illegible] policy, it should be grubbed witho [illegible] converted into tillage, in which state [illegible] highly productive for many years, a [illegible] ary to have more wood, fresh land should be [illegible]. If this was attended to upon the visible decay of old woods, a succession of thriving underwoods might be always kept up for the full supply of the country.

In the western part of the county a great many witheys and osiers are grown upon land of very small comparative value. The latter are grown for the basket-makers, and are cut annually; they fetch on the spot from £3 to £4 per acre, while the former are cut every four years, and are then worth from £7 to £8 per acre: these are converted into hoops, which from their lightness and toughness are highly valuable. The osiers are brought to Guildford and manufactured for the London markets. This manufactory employs a number of women, children, and men, whose business it is to strip the bark from them, which leaves the rods white: this operation is performed upon a block secured in a frame, and on this block is fixed two pieces of iron, forming a sort of forceps, the sides and bottom of which being kept moderately sharp. This machine is called a willow-break. The rods are drawn two or three times through the break or forceps, which clears them of their outer bark, and they are then made into bundles as large as can well be managed; the expence of the operation is 2½*d.* per bundle.

ELM. ULMUS CAMPESTRIS.

Pentandria digynia. Linn. Sp. Plant.

> ———There, fast rooted in his bank,
> Stand, never overlooked, our favourite elms,
> That screen the herdsman's solitary hut.
>
> COWPER'S Task, b. 1.

We find no less than seven distinct species of this tree, besides six varieties mentioned by Professor Willdenow; but of all the kinds he has mentioned, I do not believe there is any one so truly valuable as the real English elm.

This tree delights in a deep loam, or a soil that is of a gravelly tendency; it is found flourishing sometimes on chalky as well as sandy soils, and in this county it will be more particularly seen to the northward of Croydon, and on the London side of the chalk hills to Guildford, about Stoke, Shire, Abinger, Haslemere, Wooton, Betchworth, Buckland, Reigate, and Farnham. At each of these places there is very fine elm growing spontaneously in the several hedgerows; and was as much attention paid to its preservation, it would be found in as great abundance and perfection in this county as oak. Many of the trees I am alluding to are very large and handsome, and would cut into scantlings of almost any dimensions.

In the parishes of Lambeth, Streatham, and Mitcham, there have been very large breaks in consequence of the great demand for the navy, and the several waterworks throughout the kingdom. Those of rticularly have, I am informed, been supplied from the county of Surr to these we add the immense consu London waterworks, those at Chelsea, e New River, and the Paddington Cana l not be surprised if the price has in cent.

There is a sort is occasionally found in this county, but which abounds in most of the northern ones, called the witch or the Scotch elm. I have met with some of them at Guildford, which were converting into plank, and the grain of which was closer, and the wood harder and tougher, but it was apt to be more knotty, and not to run so straight as the other sorts do, for any length. It answered, for cart and waggon purposes, the wheeler told me, better than the common elm, and would do very well for coffin boards; but its invariable crookedness caused so great a waste of stuff as to make it on the whole not so valuable as the true English elm.

Elm is converted into plank for the navy and for barge builders, into coffin boards, and for carts and waggons, and also cut into naves for wheels; the lesser trees are purchased by the pipe borers, who are satisfied with them at small sizes.

Ten years ago good elm sold for 8*d.* and 9*d.* per foot round measure standing, within the last three or four years, the same quality of timber has sold at 16*d.*, and capital as high as 18*d.* per foot, if not higher.

Good plank is worth from 2*s.* to 2*s.* 3*d.* per foot cube.

ASH. FRAXINUS EXCELSIOR.

Polygamia dioecia. Linn. Sp. Plant.

——— for nothing ill.
SPENCER.

Professor Murray gives us an account of only three distinct species of this tree; but we have certainly five or six more cultivated in the nurseries about London, and among these the weeping, the flowering, the entire leaved, and the black ash, are not the least conspicuous.

The common ash, which is more immediately the subject of our consideration, is found in the hedgerows in every part of the county, but in no part grown as a distinct article either for timber or for hop poles as it is in Kent, Worcester, Hereford, or Berkshire. It is characteristic of no peculiar soil, being seen upon the strong clays, the loams, the chalk, and the sand, upon the summits of the hills, the sides, and in the valleys. It is one of those trees that is almost invariably and shamefully pollarded.

Its uses may be said to belong to the farm almost exclusively. The plough, the harrow, the waggon, the cart, the flail, the riddle, the skreen, the milkpail and churn, the rack, the trough, the hurdle, the wattle, and the weather-boarding; in short nothing comes amiss to the usefulness of this tree.

As timber, it is worth from 18*d.* to 24*d.* per foot, or £5 to £6 per load, according to its size and quality. Plank, from 2*s.* 9*d.* to 3*s.* 3*d.* per foot cube.

As poles either [illegible] p bender or the nurserymen, they a [illegible] m £10 to £20 per statute acre, acc [illegible] ir age. For the latter they are made u [illegible] s according to their size, in twelves, t [illegible] and thirty-six to the bundle, and are [illegible] ut 2*s.* 3*d.* a bundle. Billets are som [illegible] of the spray ash, and no wood produces [illegible] eady, brilliant flame, either dry or green; these billets fetch about 15*s.* per 100.

Where ash is found to thrive well, as upon the borders of the Thames, it is not unusual for an acre to fetch at 10 years growth £22.

The ash is by many counted a beautiful tree, but it has the defect of losing its leaves very early in the autumn, and of being injured by the frost in the early part of spring; of the number of its admirers we must rank that great Georgical poet Virgil, who thus speaks of it:

> Fraxinus in sylvis pulcherrima ——

Its wood is in some instances highly variegated. I had an opportunity this last summer of seeing a box at Tunbridge Wells made from an ash tree, that grew in Sussex, and in that neighbourhood, which was not only finely polished, but was most beautifully veined.

BEECH. FAGUS SYLVATICA.

Monoecia polyandria. Linn. Sp. Plant.

In the Systema Vegetabilium of Professor Murray, we find only three distinct species of this tree, one of which is the Spanish chesnut, another is the chincapia of America, and the third is the sort now under consideration. The former and the latter have each of them one variety.

This tree is principally confined to a certain range in this county, namely the chalk hills, where it may be said to be indigenous, it thrives also upon the sands, as about Wotton, &c.; but is no where to be met with luxuriant upon the clays.

At Godstone, in the hundred of Effingham, at Ashted, at Fetcham, and at Bookham. In the hundred of Croydon, at Bansted, Carshalton, Chaldron, and Coulsdon, this tree will be found growing in great perfection, although in infinitely less quantities than formerly; and considering its vast utility, and the ease with which it is raised, it is to be lamented that more attention is not paid to its increase, the more so, as it flourishes where few other trees will grow, and is an ornamental tree. It must ever class among the finest trees of the forest, although I know that I have Mr. Gilpin's opinion against me.

Of late years a great deal of beech has been converted into various uses for the ordnance, not a little is used by the wheelers, and immense quantities have been burnt into charcoal.

The ordinary price of good beech is about 1*s*. to 1*s*. 3*d*. per foot.

Plank, from 18*d.* to 2*s.* per foot cube.

The specific gravity of beech according to Gren is 0.8520 0oz. 3drms. 34.9grs.

I have lately learnt from two eminent timber dealers, that large beech is in great request for the navy, in forming the stern posts, the stems, the very keels and some other parts of the largest men of war. Such [illegible] se, and being raised with greater fac [illegible], and even affording shelter to it, it [illegible] shed that more trees were left among [illegible] oods where they are found to flourish [illegible] timber, as well as to raise plantations [illegible] belts, or otherwise in the western part [illegible] y, where the immense tracts of unprodu [illegible] invite the attention of the spirited planter.

Count Rumford has proved, by a series of well connected experiments, that beech affords in its combustion less heat than pine wood, which, as he says, is contrary to the established opinion. He found by repeated trials, that 43lb. of dry beech wood were necessary to prepare 89lb of peas-soup, and upon a medium 38lb. of dry pine wood was sufficient to prepare the same quantity.

BIRCH. BETULA ALBA.

Monoecia tetandria. Linn. Sp. Plant.

In Linnæus's Systema Naturæ, and the Supplementum Plantarum, there are seven species of this tree, and one variety which he calls dalecarlica, whose description answers to the one usually called laciniata; but as we have only to do with the comion sort at present, it will be necessary to consider iat first.

This tree grows spontaneously on all the heathy arts of the western division of the county in the reatest abundance; and it thus propagates itself y the scattering of its seeds, which from their ghtness are carried to a great distance. It forms portion of most of our underwoods, and is adiirably calculated for shelter to all young planttions, let the soil be what it may.

Its principal use is for brooms, the manufacory of which is carried on in this county to a ery great extent, and perhaps the depot for this rticle in the borough of Southwark exceeds that f any other part of the globe. The timber is ight, but has, nevertheless, some strength. It is ised in this instance for sundry light farming puroses, and also by the turners, for bowls, dishes, nd trenchers. It furnishes hop poles, and wood or colliers' ware, and in some cases hoops also are nade of it.

I have no where found that wine is made in any uantity from this tree; I apprehend it is not conidered to pay for the trouble, but I am assured hat it is infinitely superior to the inferior sorts of French wines. When I was at Paris I was much ntertained with a very eloquent discourse that vas delivered at the Salle de l'Oratoire, on the seond complementary day of the year 10, which nswered to the 19th of September, 1802, by Mons. Lasteyrie, one of the members of the Naional Institute, on the cultivation of the bouleau r birch tree, for the purpose of making wine, and the best modes of performing it. He had made a great deal of it, and from the conversation which I had the pleasure of having afterwards with him, I was given to understand that when it is properly fermented, it is a delicious wholesome liquor, from which a saccharine spirit may be extracted in all respects antiscorbutic.

The smaller [illegible] makes very excellent potash.

The price of [illegible] rooms is 16*s.* per 100 faggots in the [illegible]

Stakes for [illegible] per bundle, delivered in.

The price of [illegible] ns complete is 2*s.* 6*d.* per bundle of 12 delive [illegible] London.

A very peculiar property belongs to the bark of this tree; which is that of being more firm and durable than the wood it clothes. It is I understand, made use of in the northern countries where it abounds, such as Sweden, Lapland, &c. as tiles for covering their houses, being first pared and shaped for that purpose. In the latter country they are often found blown down, and after having lain prostrate for years, and until the substance of the wood has been entirely gone, yet the bark has remained perfect without signs of decay.

LIME. TILIA EUROPÆA.

Polyandria monogynia. Linn. Sp. Plant.

In the species plantarum of Willdenow we find four species and six varieties described of this celebrated tree. The one which we are about to describe is, however, the only sort that is to be met with in its native state in Europe, the others being indigenous of the continent of America.

This tree, though not found spontaneous in our woods and hedges, is nevertheless, met with in considerable numbers about the dwellings and parks of people of fortune, where the beauty of the tree, the fragrance of its blossoms, and the rapidity with which it grows in almost all soils, have contributed not a little to administer to the demand which luxury has created for it. That demand has of late years been very great, and is, I understand, still increasing.

The principal use of the wood is for the harpsichord, the piano forte, and the pedal-harp makers, for which purposes it forms the sounding board; the celebrated Mr. Broadwood was the largest purchaser about four years ago of these trees I ever knew, I believe there could not be much short of 100 load of timber in them. By the cabinet makers the wood is used as veneers; turners and carvers employ it in their respective businesses, and architects for framing their models of buildings; and in short as the wood is light, it is fit for any inside work. That ingenious artist Gibbon used it for that curious sculpture which adorns some of the old houses of our nobility.

In the northern countries, particularly in Russia, the growth of the lime is particularly attended to, on account of its bark, which forms a very considerable article of commerce, especially from the port of Archangel.

The bark is stripped from off the tree, and is manufactured into those mats which are denomin-

ated single and double, that is, the small sort which are wove close and thick, with a bark less fine and supple, and the large or double mats which are much wider and longer than the single. Both sorts are, however, used in immense numbers by nurserymen and gardeners, for covering their frames in the winter season, the frost, and in the
summer, to k ence of the sun's rays;
they are also the former in packing
as well as by t s and packers.

It has often f surprise to me, that
no attempts h de in this country to
manufacture th cause it is sometimes so
scarce, as ha rocured, and the mer-
chants who are cquainted with the consumption, take pretty good care not to overcharge the market at any time, but rather feed it, so that the price is always kept up to a certain standard. Sometimes, however, I have known it advanced 100 per cent.

In any deep loamy soil this tree grows rapidly and luxuriantly, making a shoot of three or four feet in a season; it propagates freely from seed, and as readily by layers, and in general I think that trees raised in the latter way turn out the handsomest, though perhaps they do not grow so fast.

As a great part of this county appears so well calculated for the growth of this tree, and as our manufactures are not behind those of any other country upon earth, I see nothing to prevent the establishment of such a manufactory in this or any other county, and indeed it would be no less desirable as furnishing employment for a number of people, and as preventing a great deal of money from being sent abroad in the purchase of these articles.

I have not the means of ascertaining with correctness the consumption of mats throughout the United Kingdom, but I am of opinion that, communibus annis, it does not amount to less than one million, and stands the consumers in not less than between 30 and £40,000.

The large mats come over tied up in bundles of 10, the small mats more generally round flax, and hemp seed, or linen or hempen goods.

The price of clean timber is from £5 to £7. 10*s.* per load, according to its size and its distance from London, and its situation as to land or water carriage.

At Betchworth castle, in this county, the seat of Henry Peters, Esq. there is a very fine avenue of limes 150 yards in length, of considerable height and size, most of them containing not less than two loads of rough timber per tree.

Besides the advantages that I have already mentioned to be found in the cultivation of the lime tree, the following may not be unimportant.

For shade there are few trees so well calculated to keep off the meridian sun during the summer solstice, because its leaves are large and the boughs numerous.

The bark of the tree is so tough, that we very seldom hear of its limbs or branches being torn off or injured by hurricanes or thunder storms.

The tree scarcely ever grows hollow; wherever a limb or branch is taken off either by accident or on purpose, the wound presently heals over to the exclusion of the air and insects, and consequently, it soon becomes as sound as the rest of the tree.

It is said to be the best wood for carving that is known, and when reduced to charcoal, perhaps none is so much to be recommended for making gunpowder.

The weight [illegible] foot of lime is about 41lb. 10oz. and [illegible] gravity something better than 66.

BOX. [illegible] PERVIRENS.

[illegible] *tetandria. Linn. Sp. Plant.*

Linnæus mak[illegible] f only this one species of this genus; there is a [illegible] er sort cultivated in the nurseries, which is called the dwarf, and which, as it uniformly preserves its character, may justly be considered a distinct species; but Linnæus does not take notice of it even as a variety.

In no part of the United Kingdom does this tree grow in so luxuriant a manner, and in such large quantities as it does in this county. It is not only indigenous, but it appears to be almost coeval with that celebrated hill to which it gives name, viz. Box Hill, a spot well known to every Surrey fox hunter; it is situated near the market town of Dorking, stands considerably elevated, commanding very extensive views. The soil is thin, loamy, rather light, upon a limestone.

This estate is now the property of Henry Peters, Esq. of Betchworth castle, who since the purchase, has been very desirous of preserving untouched the whole of the box then standing, but unfortunately for him, his predecessor had sold it for £15,000, for which the purchaser was to be allowed 14 years to cut it in. Forty tons were cut in 1802. Formerly, when the quantity that was cut, by no means equalled the demand, the price of prime box was 28*s.* per hundred weight; but in consequence of the great quantity which has of late years been cut, the introduction of it from abroad, and the various substitutes that are used, the price does not much exceed £5 per ton.

In preparing it for market, the moss and all the rough bark is taken clean off, for which 12*s.* is charged per ton; and it is in this state only that it is saleable.

It is supposed to require 70 years growth before it is fit to be cut, and when cut, it springs up again from the old stump, producing a regular succession. It also scatters its seeds about in great profusion, which quickly vegetate, so that there is seldom a deficiency of crop. The people in the neighbourhood are very much inclined to think that it does not flourish so well as it formerly did; owing, as some are of opinion, to a change in our climate, but as others think, to an improper and indiscriminate way of cutting it, and the want of proper protection from cattle, &c.

The turners in London and Tunbridge are the principal buyers, but the cabinet makers also use it for veneers, and large quantities are sent to Birmingham, Sheffield, and Manchester.

The wood is very heavy, close grained, and beautifully variegated; its specific gravity is as follows:

The specific gravity of English box is 1.5460, 6 drms. 32 grs.

The specific gravity of Dutch box is 1.3280, 5 drms. 35 grs.

The specific gravity of French box is 0.9120, 3 drms. 50 grs.

HORNB[illegible]NUS BETULUS.

[illegible]*olyandria. Linn. Sp. Plant.*

In Linnæus's [illegible] uræ, Vol. III. p. 631, mention is mad[illegible]o sorts of hornbeam, the common s[illegible]s, and the hop hornbeam or carpinus [illegible]t there is also another sort, the orientalis [illegible] which has been many years cultivated in England, and of which there are some large trees growing in this county.

The common sort abounds in various parts of the county; wherever beech flourishes, the hornbeam accompanies it. Upon the coldest chalky hills, and in the stiffest, almost barren clay, it grows and oftentimes luxuriantly. In hedgerows it is frequent, and among underwoods almost invariably. In forming internal fences no tree affords more shelter, grows more rapidly, and bears clipping more freely; it has also the superior advantage of rooting well, and therefore may be transplanted with perfect safety at 8 or 10 feet high, by which an immediate skreen may be formed. In parks it is a very desirable tree, because the brutting of the deer does it little or no injury.

The wood is white, tough, and flexible. It is used by turners, by millwrights for the cogs of the wheels, (for which purpose it is preferred to yew,) it is made into handles for tools, and for stocks; its weight is as near as possible 43 lb. 9 oz. to the foot cube.

It makes good and lasting fire wood, and burns clear and light.

Being almost evergreen, retaining its leaves until spring, it becomes of singular use in all new made plantations, and if planted round farm yards or stack yards would form an admirable loo thereto. It is much used between gardens of hops for that purpose.

It is sold at 9*d.* to 1*s.* 3*d.* per foot cube, and in plank from 20 to 24*d.*

WALNUT. JUGLANS REGIA.

Monoecia polyandria. Linn. Sp. Plant.

Of this genus Linnæus mentions five species.

It is by no means a decided point whether this tree is an indigenous one or not; Linnæus says it is a native of Persia; if I may judge, however, from the frequent use of the timber formerly in this county, it would appear that it was also a native of Europe, if not of Great Britain.

I have no where found this tree in any of the old woods of this county, either in timber or stools, although formerly it abounded in our forests nearly as much as beech; but in the grounds, orchards, and yards of gentlemen of fortune, farmers, and others, it is frequent.

The largest plantation in this county is, I believe, in Beddington park, where there are a great number of very old thriving trees, which in favourable seasons yield a great abundance of very fine fruit, principally of the English or common sort. The French or double walnut, as it is called, grows more free than the former, is more tender, and is not so productive in fruit.

The fruit of this tree adds something to the annual commerce of the county, and the great mart for it is Croydon fair, which is usually held in September, at which, an immense concourse of all ranks of people attend, as well from London, as from the country for many miles round; in fine weather, perhaps not less than 20,000 have been collected in one day to enjoy the amusements of the place. In a favourable season I have computed that not less than four millions of walnuts have been retailed in the three days of the fair, which have yielded a return of £2000; besides which, large quantities are sold wholesale to the London dealers, fruiterers, and orange merchants, to the amount of six or eight millions more, so that I think we may safely calculate upon £4000 being returned in this article. If to these numbers we add the vast importation of this fruit from France and Germany, we may reckon the annual consumption of the kingdom at something about twenty millions of fruit.

This tree delights in a deep, sound, rich feeding ground; it will grow upon chalk, provided there be depth of mould, extremely well; and also upon strong, stony, and clayey soils; but it requires to be sheltered from the north and east, since the spring frosts are apt to kill the young and tender shoots, and thereby destroy the fruit in embryo, which was very much the case in the spring of 1803. It has an insuperable objection to much pruning, or lopping, being subject to profuse bleeding after such an operation.

As timber, it is found to be more durable than oak in particular cases. There are several old houses at this time remaining in the borough of Southwark, which have been built upwards of 200 years, the bearers, girders, and some of the rafters of which, are of walnut; they had been supposed to have been of chesnut, but I have no doubt at all that such as were shewn to me were walnut, and most of the workmen were of the same opinion; and in pulling some of these houses down a few years ago, the timber was found to be as sound and as fresh as when first put up, and so hard that the saw and chissel would hardly touch it.

Besides its value for such purposes, we find it converted into bedsteads, tables, chairs, drawers, &c. by the upholsterers and cabinet-makers, and formerly it was much used for wainscoting by the joiners. It is now sought after for gun-stocks.

What a pity that a tree so truly valuable, should be so much neglected in every part of this kingdom, since it is so easily raised from the seed. In Picardy and Normandy they have extensive plantations of them, which thrive admirably; and there is scarcely a part of the eastern or southern part of this county, where they would not succeed equally well; even in many parts of the western division, they grow in a very luxuriant manner, sufficiently so to induce us to encourage their cultivation upon a large scale.

The price of the timber varies very much. I have sold some large trees at a distance of between 30 and 40 miles from London, and the greater part land carriage, f [illegible] d. And I have sold them the same [illegible] less distance for £7 per load.

They are sel [illegible] until they get into the hands of t [illegible] akers, who, I understand, sell them [illegible] to eight shillings per foot cube. Alm [illegible] ole of this difference arises from the ri [illegible] e veins, and the other qualities in the wood. I am told, however, by the cabinet-makers, that it is apt to become worm eaten when constantly exposed to the air, without having been painted or varnished; but the application even of the common linseed oil will tend very much to its preservation, and then time causes it to increase in hardness and durability.

The specific gravity of walnut tree is 0.6710, 2 drachms 49 grains.

In tracing the river Wandle and the iron railway, lately for the purpose of completing that part of my survey, I had occasion to visit Beddington, which gave me another opportunity of making some further enquiries about the trees in that ancient park; and I find there are upwards of 50 trees, but as many of them are not so flourishing as others, owing to the humidity of some places, exposure in others, and to repeated injuries which they seem to have received from time to time; the annual product of walnuts seldom exceeds £50; but whatever sum the renter may agree to pay for them, it is commonly understood that he clears above one hundred per cent.

MAPLE. ACER CAMPESTRE.

Polygamia monoecia. Linn. Sp. Plant.

——— the maple, seldom inward sound.

SPENSER.

Of the genus Acer Linnæus mentions eleven species, but there is also a twelfth cultivated in the English nurseries, which is evidently distinct from any of the others, and is called the cut leaved, or opalus. The species we are about to describe is called the common maple.

It is found in the greatest abundance in all our hedgerows, copses, shaws, &c. throughout the county. It is a tree of no great individual beauty, yet where variety and shelter are objects of consideration, the common maple is not without its advantages. Formerly I understand there were seen maples from 20 to 30 feet high, in the parishes of Burstow, Horne, Horley, and Charlwood; but those which I have met with containing any timber having been most barbarously pollarded, were prevented from attaining any great size. I am afraid that so long as the tenant is permitted to have all the loppings from every pollard on his farm, and as long as the pollards are allotted to him for repairs, as well as for plough boot and cart boot, it will be the tenant's interest to pollard annually as many of the thriving young trees of all sorts as he can consistently, in order that he may have a regular succession for all his purposes: and although he may not always enjoy this fruit of his care, yet as every tenant does this in a greater or less degree, if he quits one farm he goes to another where he finds due provision has been made for him by his predecessor. I may therefore venture to say that so long as this custom prevails, we can [illegible] have any large maples as timber, but in [illegible] d grounds and farms in the occupati [illegible] ors.

There is one i [illegible] attending the growth of this tree, wh [illegible] from a certain sort of honey dew whi [illegible] d upon the leaves; for wherever this [illegible] ch injures every thing that grows underne [illegible] ially if that be quicks, which it presently mildews. This honey dew is nothing less than sugar, and in quality little inferior to that which proceeds from the cane.

The tree delights in a dry loamy soil, and it thrives best upon banks, yet it is found to make strong shoots in a moist clayey soil, but the wood is neither so close grained nor so durable. It is in every soil a light wood, and consequently is much used by the turner for trenchers, bowls, ladles, dishes, drinking cups, and other culinary uses; and, therefore, is generally to be found in common use in farm houses, instead of earthen or other ware: these utensils when kept well scoured and cleaned, become white and look very wholesome. When the tree grows slowly as in gravelly soils, and ramifies very much, the knots formed by these branches are much coveted by the joiner and cabinet-maker, for inlayings, as well as by the

Tunbridge and Birmingham manufacturers; and when the wood is clear and free from knots, it becomes then adapted for musical instruments. Ovid speaks of it as,

> ——— Acerque coloribus impar.
>
> MET. LX. v. 1.

The value of the wood is nearly the same as beech, which for some uses it greatly exceeds.

The specific gravits of maple is 0.7550, 3 drachms 10 grains.

The Midsummer shoot of the maple was in 1803, on the 15th of July, and in 1804, on the 21st of July.

CHESTNUT. FAGUS CASTANEA.

Monoecia polyandria. Linn. Sp. Plant.

Of this important genus, I have, under the article beech, said, that there are but three distinct species, two of which exclusively belong to the chestnut.

This tree, which may be admired for the gratefulness of its fruit, the usefulness of its timber, and the elegance and magnificence of its growth, is found in tolerable plenty in many of the copses in the county, and as timber in most of the home grounds and parks of the different noblemen and gentlemen dispersed through it; among the number, we must not omit to include those which are now growing at the seat of Henry Peters, Esq. near Dorking, where is a considerable avenue of them in the approach to the house, many of which will measure 20 feet in circumference. There are also a great many fine trees in Felbridge park, and several rows of them on Copthorn common adjoining, in a very thriving state, and containing from 20 to 40 feet of round timber.

The soil most favourable for the growth of this tree, either for timber or the fruit, is a kindly loam, if with a sandy or gravelly substratum the better; but they will g ny deep soil, even on cold tenacious any exposure, as at Copthorn, pro is no object.

As timber, t aluable, nor is it less so as underw ill be more particularly noticed h not think it quite so durable as wal aps so hard, but it is much more so is less subject, when once properly seasoned, to swell and shrink than any timber that is grown in this country. It was formerly in great request, and much used in the buildings about London, and some of those have been known to stand 600 years, and the timber quite sound. Indeed, I remember a Mr. Long, a very eminent builder and carpenter at Christ's hospital, London, telling me that he was once employed to alter a large old house in the city, and in taking off the roof, the timbers were discovered to be sound and fresh, and the nails so fast in that they could not be drawn. His men were in great doubt as to the sort of timber they were at work upon, because it was so different to either English or foreign oak, as well as walnut; but they found out by comparing it with some foreign chestnut, that it was evidently that tree, and he preserved some of the wood for many years, and it is not improbable but some of it may be still in the possession of his family. The belfry of Sutton church, a very ancient structure in this county, is composed of chestnut.

It is not at all unlikely that a great part of the old houses in London and the suburbs were built with this wood, since our countryman Evelyn in his Sylva takes notice of large forests of chestnut trees that formerly grew in the neighbourhood of London. Indeed, Dr. Ducarel, with whom I had the pleasure of being acquainted, has satisfactorily proved to me that there were few woods in England in which this tree did not abound formerly. He always referred to the time of the 2d Henry, where is to be seen a deed of gift from Roger Earl of Hereford, to Flexley Abbey, to the tithe of all his chestnuts in the forest of Dean.

The wood being thus so valuable, it is of course applied to many useful purposes, such as bedsteads, chairs, tables, trunks, chests, &c. &c. It makes a very durable wainscoting.

At Paris, I saw some casks made of it, lying upon the quay oppoite the Grand Galerie de la Musée. I was attracted by the wine which a merchant was drawing out to taste, which I thought had been brandy, but upon enquiry he told me it was an Italian wine, and with the usual politeness of the country he gave me some to taste, which I thought resembled bucellas, but which he called Nice wine. These casks contained as I judged 36 gallons, and had been just landed from a barge from Rouen.

The wood was darker than oak staves generally are, and much closer grained, and it was not till the cooper came to work that the merchant or myself could make out what the wood was; but he presently satisfied us that it was the Chataignier de l'Italie; they were considered the best casks that were made. I mentioned this afterwards to one of the members of the national institute, who told me that it [illegible] y the custom in some parts of Italy [illegible] make most of their casks of the wo [illegible] e; but of later years the cultivation [illegible] ut tree had been neglected, and th [illegible] of American staves instead, which [illegible] great pity, because before the revol [illegible] several of them which had been in his [illegible] ; before he could remember, and which, although constantly in use, were never known to leak. But in order to make it thus retentive, the wood required to be well seasoned before it was converted, and then the staves to have another seasoning before they are made up, and the cask to have another good seasoning before it is used; afterwards it will neither shrink nor swell, preserving the same magnitude upon all occasions.

The fruit of this tree which is produced in this county, or indeed in any other, is not of any great consideration in point of traffic; what there are, are in general small, but very sweet; the consumption of them is, I believe, principally divided between swine who fatten fast upon them, and the nurserymen who prefer them to those from Spain, because the latter, although larger and finer, are for the most part kiln dried, by which means vegetation becomes destroyed.

The leaves being large and fleshy, are very proper to litter down yards with; they will keep the cattle dry, and when saturated with the sulliage thereof, will make a most invaluable manure. The florist considers a few barrowfuls of these rotten leaves as a very great acquisition.

The price of the timber is from £7 to £9 per load, according to its goodness, and the fruit from 16*s*. to 21*s*. per bushel.

If the bark is left on the poles that are used for hops, perhaps no other sort of poles will last so long. In every point of view, therefore, this tree deserves to be more generally cultivated.

In my several journeys through Ashted, I never had the good fortune to meet with Mr. Davie, the venerable gardener at Ashted park, near Leatherhead, the seat of Richard Howard, Esq. from whom I wished to have received the account of those fine chestnut trees which are to be found there. I am therefore indebted for this, as well as a great deal of other information, to my much valued friend Mr. Wm. Forsyth, at Kensington. When Mr. Davie was a lad about the age of 13, he bought a few shillings worth of chestnuts in London to treat his fellow servants with; but as they did not choose to accept of them, he sowed them in a bed in a garden at Ashted, which then belonged to the Earl of Suffolk, and afterwards planted out the young plants where they now stand. The trees are, I understand, between 60 and 70 years old from the seed. I measured several of them, which at five feet from the ground measured near six feet girt, but the favourite tree at three feet high measured above seven feet girt, with a stem full 54 feet. The most famous tree, according to Mr. Forsyth, is at Lord Ducie's at Tortsworth, Gloucestershire, which measures 19 yards in girt, and is proved to have been there before the conquest.

POPLAR POPULUS.

[illegible] *tandria. Linn. Sp. Plant.*

> The popl[illegible] lines his leaf.
>
> COWPER.

Linnæus mak[illegible] only five species of this genus, but [illegible] species besides varieties cultivate[illegible]eries about London. Of these species, [illegible] the black, the Lombardy, and the aspen poplars, are those which are to be met with growing in the greatest abundance in this county.

As all these sorts of poplars delight in a moist soil, and will grow in any situation, and as they are easily propagated, and the wood of no inconsiderable value, they appear to me to deserve more encouragement than I have any where met with. The rapidity of their growth makes them yield a quick return, and although it is natural to conclude that such rapidity would make the timber soft and no ways durable, yet such is not the fact; for at Stockwell, where I have a small estate, there are some buildings which were erected 20 years ago or thereabouts, the rafters of which are either of abele, which is the white poplar, or of the Lombardy poplar, and are now perfectly sound, the floors of some of the buildings, and a stair case also are composed of these two sorts, and aspen, (tremula of Linn.) and I have no doubt will last as long as the best foreign deal, notwithstanding they were sawed out green and in that state used up.

The wood of the abele makes the best flooring boards, takes a good polish, and from its approaching to a more perfect white than most other sorts of wood, makes a room look clean and light; nor is the wood liable to splinter, or swell and shrink as deal does, let the quality of the latter be what it may; and from its lightness and toughness, it is well adapted for joists, &c. it is therefore particularly calculated for all sorts of farming buildings.

The Lombardy poplar makes the neatest, and next to oak in point of quality, the best sheep hurdles or wattles I know of: running always straight, and splitting or rending easily, the bars can be set at regular distances with a degree of uniformity, that makes them look more like a lawn fence than a sheep fence; whereas oak, ash, sallow, or maple, are always irregular from the natural crookedness of those plants; they are also more durable than either of the latter, great numbers of them are annually made at the Marquis of Salisbury's, at Hatfield, which are used in the more dressed part of his lordship's park.

As this plant is so easily raised from cuttings, every slip, whether large or small growing readily when stuck into the ground, it would surely be a very desirable plant upon every farm where the soil is not too near the chalk; and as many plants would not take up much room, say 2000 upon one

acre, it would allow of 200 to be cut every year after the first cutting had commenced, which in suitable soils might be in 14 years, and these 200 trees would make 100 wattles at least, four bars high; but I have known every tree make a wattle at 18 years growth. A regular supply of plants might be always insured from the stump, which
will throw up inn ots, which it would
be better to remo two or three at most
for a crop. If ot choose to convert
an acre or so to ve purpose, there are
always odd corner rm, as well as round
his rick yard, v ay be planted with
great advantage, eans at all times of
furnishing a const of materials for this
most useful article.

Besides the usefulness of this tree agriculturally considered, it is, I find, employed in constructing an instrument peculiar to the English, and in the use of which no nation under the sun can equal them, I mean the cricket bat. I have seen a great many of them, which for strength and lightness are not to be equalled by any other sort of wood; they are in general free from knots, and bear a high polish, and in the opinion of the maker were more durable than those usually made of willow.

I am told that in Italy they use the younger trees for hoops, which prove exceedingly good, but I have not been able to learn that any of our coopers either in the county or in the Borough of Southwark, (where there is the principal depot for the supply of the city of London and its environs,) have yet made any trial of the Lombardy poplar, which I can readily account for; because, hitherto the tree has been planted more for ornament or shelter than for profit, and where it may even have been with a view to the latter, it has ever been considered only useful as timber, and not for poles or minor purposes.

The abele, the black, and the aspen poplar are severally used by the wheelwrights and turners.

The price of poplar is from £3 to £5 per load, according to its size and quality.

CHERRY, THE WILD. PRUNUS AVIUM.

Icosandria monogynia. Linn. Sp. Plant.

The genus prunus not only includes the cherry properly so called, but also the plum, the bullace, the sloe, the damson, the apricot, the Portugal and common laurel, and the different species of bird cherry, comprising 33 different species, according to Willdenow, and an immense catalogue of varieties of some of those species, which does not come within my plan to enumerate.

In almost every wood throughout the county, the wild or black cherry abounds, formerly it made a considerable figure among the timber trees, being suffered to acquire a great size before it was cut down; but it is only now and then that we meet with them at this time of day, either in any quantity or of any size. In underwoods and copses they still occupy no inconsiderable place, where their early blossom gives a beautiful relief to the otherwise gloominess of the scene; while their fruit forms a delicious treat to the feathered songsters that inhabit there.

The wood is close grained, weighty, and durable. It is used by turners, chair-makers, and cabinet-makers, for chairs, veneers, cabinets, and the like; and is much esteemed for its beautiful polish.

The trees are generally sold ad valorem, it being but seldom that any number of them are sold in one lot; the us [redacted] from 1*s*. 3*d*. to 1*s*. 6*d*. per foot, but I th a single tree that sold for five pou

YEW BACCATA.

nadelphia. *Linn. Sp. Plant.*

The eu bender's will.

There are only t spe es of this genus yet described, and only one of them that is a native of this country, which is the plant we are about to examine.

I have said that this tree is indigenous, and I am led to conclude so, because it is to be found in every sort of situation from the most confined or champaign, to the most exposed and difficult of access. It bids defiance to storms, and scorns every species of shelter, notwithstanding this extreme hardihood, it is very impatient of removal. On the Godstone hills, on Bansted downs, and on all that line of country that extends westward into Hampshire, it abounds; and if we travel beyond the confines of the county, we shall see it flourishing among the inaccessible hanging cliffs of Cumberland, particularly near Winandermere on the borders of those celebrated lakes; and approaching Ulswater is the famous rocky mountain called Yew

Crag, whereon this tree is found in the greatest abundance. Nor is it less exuberant in Kendall, in various parts of Yorkshire, or among the rocks in Devonshire, Cornwall, Somersetshire, &c. &c. In almost every church yard throughout the kingdom, about the most ancient castles and mansions these trees were formerly planted, not only for their ornament, but for the great use which in those early days our countrymen made of them; since the bows of yew can be traced as far back as the time of Julius Cæsar. Of it the old English yeoman made his long bow; which he boasted nobody but an Englishman could bend.

At Crowhurst alias Crowherst, in the hundred of Tanridge in the eastern part of the county, and in the church yard, there is the largest tree I have met with in the kingdom; its circumference at 5 feet high in the stem is 36 feet, and the extreme height about 50 feet. The situation of the church yard, standing upon a bold elevation, commanding the most extensive views of the counties of Kent, Surrey, and Sussex, and forming, as it were, a rallying point to each; together with the antiquity of this tree, gave birth to the following lines from the juvenile pen of a gentleman, whose father has long graced one of our senatorial assemblies with no small celebrity.

Hail! venerable tree! whose ample head
* Five hundred summers o'er this turf has spread;
This sacred turf! where turn'd to parent clay,
"The rude forefathers of the hamlet" lay;

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* Such is the tradition.

Thrice hail! for to thy gen'rous trunk, we owe
The hero's lance, and the elastic bow.
  Oft when Bellona blew her trump to arm,
And discord drew the peasant from his farm,
To thee tall tree! * the village youths would fly,
And from thy sturdy arms the war supply;
Trim thy tough bows they knew so well to use,
To deal high deeds for the historic muse.
  If for the Barons bold, thy bows were bent,
Ere stubborn [illegible] o relent;
Thrice blest b [illegible] bound to thee,
For Albion's g [illegible] liberty!
  If for the ha [illegible] ms were spread,
When civil f [illegible] rose red,
T'oblivion sh [illegible] consign,
The fault was [illegible] deed was thine.
  What tho' n [illegible] y pow'rful aid,
Since dreadful [illegible] arrior's trade;
Still may'st thou [illegible] nd flourish still
The pride, the glory of this peaceful hill;
And may the clown that wounds thy boughs or bark,
Ne'er court thy shade, to hear the soaring lark;
May dryads haunt him in the woodland way,
When sinks the moon before the break of day;
And † wond'rous tree! that has ten ages stood,
May light'ning never blast thy hallowed wood;
May those who guard thee without pain decay,
And thou, in turn, shed ‡ yew-tears on their clay.
  Be't thine, § O Walker! to preserve this tree,
And he shall praise, who yields this verse to thee.

T. N.

The wood of the yew tree is much used by turners, especially at Tunbridge, where it is con-

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[*] Anciently the parishioners were obliged by law to plant yew trees in their church yards through England, for the purpose of supplying the king's archers with materials for bows.

[†] The girt of this tree can hardly be encompassed by a waggon rope.

[‡] Provincial, the drops from the yew after a shower.

[§] The minister of Crowherst.

verted into all manner of fanciful purposes, particularly snuff boxes, caddies, work boxes, dressing cases, &c. It is used also by chair makers; and for steps to ladders. For axle-trees I am assured by wheelers that no wood is so durable, and for bedsteads it has the credit of keeping away bugs. The young shoots are in great request for whip handles and walking sticks. It is always sold by view, depending upon the size and the number of its branches; a good tree will fetch from three to five guineas. Mr. Jolliff's rick frames are placed on stumps of yew, in which situation it is said they will last a great many years.

Yew is a very dangerous tree to stand in any situation where cattle are subject to depasture. A few years since a gentleman in Kennington-lane lost two fine cows and a horse by brousing on the young shoots of yew, and which, on dissection, were found undigested in the stomach. There are very few old farm houses where these trees are not to be seen either about their yards or their orchards where cattle frequent; I have frequently remarked their poisonous tendency to the farmers of this county, but as they never saw any ill effects from them, they are suffered to remain. In this, however, they are not singular, for many grave writers on natural history have said as much, even our countryman Evelyn; but Cæsar, whose authority is at least equally good, thus speaks of it: "Cativulcus, rex dimidiæ partis eburonum, qui unà cum ambiorige consilium inierat, ætate jam confectus, quum laborem aut belli aut fugæ ferre non posset omnibus precibus, detestate ambiorigem, qui ejus consilii auctor fuisset, *taxo*, cujus magna in Galliâ Germaniâque copia est, se examinavit."

Comment. lib. VI. sect. 29.

HOLLY. ILEX AQUIFOLIUM.

Tetrandia tetragynia. Linn. Sp. Plant.

There are 19 [illegible] his genus in the Species Plantarum of [illegible]

This very us[illegible] tiful evergreen is found in great abund[illegible] e wastes, in the hedge-rows, in copse[illegible] variety of other situations in every [illegible] county. Its hardiness, its beauty, and [illegible] ut above all its value as wood, makes it [illegible] ving much more attention to its cultivation [illegible] it is found to experience either in this or in any other county; and the only reason that can be assigned for it is, the difficulty which usually attends its transplantation, which, indeed, I have often experienced with extreme regret. But even this difficulty may be remedied if not entirely removed, where it is desirable to have a mixture of them among deciduous trees, or in open and exposed situations for shelter, by sowing their berries when thoroughly ripe, and keeping the plants for three or four years free from weeds.

If they are cut down close to the ground, when they have attained the age of six, eight, or ten years, they make the most rapid and luxuriant shoots imaginable, and it is in this state, that they fall a prey to those scoundrels who are continually prowling about woods and copses, in search of walking sticks, whip handles, and the like, for which the demand is now so great, that waggon loads at a time are sent to London to the different cane shops, and which principally consist of holly, yew, crab, maple, and hazle; but the two former are the most sought after.

There are many very large trees in the county, as high as 40 feet, and of large girt; there are also many variegated ones that are upwards of 30 feet, many of which are to be seen in Stockwell park.

The wood is extremely hard and white; its durability is very well known to the millwright, to the blockmaker for callico printers, to the turner in general, to the Tunbridge-ware manufacturer, and to the engraver. The wood is also used as handles for a variety of mechanical tools, for which it is unrivalled, and before the introduction of iron, it was used for bolts to doors, especially to farm houses, where many of them are to be seen to this day.

Our countryman Evelyn, in his Sylva, speaks in rapturous terms of the hollies in his grounds. "Is there any thing, says he, more glorious under heaven, and refreshing object of the kind, than an impenetrable hedge of about 400 feet in length, nine feet high, and five in diameter, which I can shew in my gardens at Says-court, at any time of the year, glittering with its armed and varnished leaves; the taller standards at orderly distances, blushing with their natural coral, shorn and fashioned into columns and pilasters, architectionally shaped at due distances."

However delectable such fashions might have been in those days, they have long since become obsolete; and they have properly given place to more chaste and natural ideas. Of the common sort there are many beautiful trees and conspicuous bushes to be seen between Dorking and Abinger, particula [illegible] state of Sir Frederic Evelyn, bart. at [illegible]here "glittering with its armed and [illegible]es, and blushing with its natural coral[illegible] those musical warblers, the thrush and [illegible], with many others of the feathered [illegible]larly the fieldfare and the redwing, to [illegible]heir coral fruit.

It is generally [illegible]iew, but the price of sticks for whip handles and for walking, is so low, owing to the infamous encouragement given by the dealers in those articles to the before-mentioned class of people, that no regular price can be fixed for them. Whenever these men fail of a due supply from the woods, the copses, and the shaws, they have then recourse to the several nurseries throughout the country, which they strip in a few nights with determined resolution. Thus was the nursery of Mr. Burchell, at Fulham, a few years since robbed of all the shoots from a number of fine yew trees, which in one night reduced the value of them from five or six shillings, or more perhaps, to less than two or three shillings, but he had the good fortune to trace his property to a cane shop at Exeter 'Change, the owner of which, to save himself, discovered the thief, who was prosecuted to conviction; but although the loss amounted to several pounds, such was the law, that a few shillings fine was all that was levied, after the prosecutor had waded through inexpressible difficulty in proving his property, in proving also that it was done in the night, and put to infinite trouble and expence in the prosecution.

I have seen holly sold as high as three shillings and sixpence per foot cube; I have heard also of its having been sold at Tunbridge as high as five shillings, and as low as two shillings.

ALDER. BETULA ALNUS.

Monoecia triandria. Linn. Sp. Plant.

I have already said, under the article birch, that there are seven species of this genus, among which this tree makes a distinguished figure.

In this light it must be so considered; for whoever would wish to see the alder in perfection, must follow the banks of the Mole through the delightful vales of Dorking, Mickleham, and Leatherhead, into the woody scenes of Cobham and Esher. Whatever beauty this river may possess, it owes principally to the alder, which every where fringes its meadows, especially in the vale between Mr. Bocket's, at Box hill, and the high grounds of Norbury park belonging to Mr. Lock. Nor must we pass over those which skirt the stream that passes through Limpsfield, Oxted, into Kent.

Of the propriety of ranking this tree among the timber tribe, I had some doubts, but having seen some very large trees in my various excursions, and having been also assured by a gentleman who resided many years in this county, and on whose veracity I could depend, that he has seen trees of this sort in the north which at five feet from the surface or ground measured within a trifle of ten feet girt, I no longer hesitated to give it a separate place.

It is so much in request in this county, under the age of 20 he patten-maker, the gunpowder ma r hoops, or for hop poles, that we r now left to become a tree, but when wood becomes fit for the turner for a mestic utensils, and is worth from one gs per foot cube.

SCOTCH FIR. SYLVESTRIS RUBRA.

Monoecia monadelphia. Linn. Sp. Plant.

In the Systema Naturæ of the illustrious Linnæus, we have only twelve species of this very interesting genus, but there are not less than sixteen distinct species, besides varieties, to be met with in the several parks and plantations in this county, particularly at Kew, Oatlands, and Pains-hill.

The Scotch fir, which we are now about to treat of, is so universally known as to stand in no need of a particular description. It forms a very considerable feature in every extensive plantation throughout the county, in some instances as deep belts to mollify the atmosphere in the interior of the grounds, in others to nurse up other valuable trees, which, either from the shallowness and badness of the soil, or from the violence of the exposure, would scarcely vegetate, and in some instances, as in the neighbourhood of Farnham, they form entire plantations without any views as to shelter, &c. but simply as to profit from them alone.

In the several parishes of Godstone, Titsey, Dorking, Leatherhead, Cobham, Weybridge, upon Bagshot heath, and Farnham, these trees are very numerous, and are become objects of great national value, notwithstanding there are many people who are still weak enough to cry them down and believe them only fit for fire wood. Let us, however, speak to facts, and before we travel out of the county, shew what there is in it that will confute this reasoning, and support and confirm our data by other facts to be met with in other counties.

It is to be understood that this same subject was treated of in our report for Surrey, published in the year 1794; but as there are a few items not to be found in that statement, and as we bring the account home to the present period, it becomes somewhat necessary to go back to the original in order that the whole may be brought under view at one and the same time.

In the year 1776, just 28 years ago, Mr. Giles, of Farnham, planted for Sir Robert Rich, bart. on Crooksbury heath, 15 acres, with Scots fir, the soil so perfectly silicious as not to be worth half-a-crown per acre, at least it never in any one year produced half that sum. The plants had been raised in a nursery belonging to Mr. Giles, and were four years old when they were planted out on the heath; but they had been previously removed, viz. at two years old out of the seed bed, and transplanted into beds or lines, at about one foot asunder between the rows, and eight or nine inches plant from plant in the rows, in this situation they remained the two years gaining strength by the free admission of the air between them, and furnishing themselves with an ample supply of fibrous and lateral roots, [illegible] ld not have been the case had they ren [illegible] e seed bed until they were planted out [illegible] ecause they are then found to have on [illegible] vo, or three at most, tap-roots, with s [illegible] ibres at all, and these being cut off, e [illegible] c spade or knife, the plant never afterv [illegible] well, when thus exposed, deprived of [illegible], and otherwise weak and drawn up, to the wind and weather, and in an inhospitable soil. But to return; at four years old we find the plants removed to the heath, and planted irregularly from 2½ to 3½ feet distance asunder, or 4840 plants to the acre. The value of the plants was from 18*s.* to 22*s.* per thousand; the digging the holes and planting cost about 40*s.* per acre. The acre would therefore cost the proprietor for trees and planting about £7, which for 15 acres would be £105, making good the plants that might fail through the plantation, £2; the total expenditure would then be £107.

In the season of 1783, which was about seven years after they were first planted out, a thinning took place, which however consisted only of stakes and spray; the latter were made into kiln faggots, and sold at 10*s.* 6*d.* per 100, and the stakes at one shilling per dozen. In 1788, another thinning took place, being the second, and about 750 trees per acre, were cut down, which sold at £8 per acre, or £120 total; in 1793 a third thinning was effected, and 750 trees were cut down, which sold at about 5*d.* per foot. At the fourth thinning, which was in 1798, the same number, or 750 trees, were taken out, which sold at 8*d.* per foot. At this time there were left in the plantation in each acre 1062 trees, of which 590 measured 869 feet cube, and were valued at 1*s.* 6*d.* per foot; and 472 trees that would not measure one foot, but were valued at £16. 6*s.* per acre. The total value per acre of the plantation will be therefore above £81. 4*s.* as per specification, and the total number of trees are found to be as follows:

Now growing.

In 9 acres are	4770 trees, which measure 7820 feet at 1*s.* 6*d.*	£586	10
In the same 9 acres are	4254 which are under one foot, valued at	150	0
In 6 acres are	3400 which measure 6600 feet, at 1*s.* 6*d.*	495	0
In the same 6 acres ...	4200 small, supposed of the value of	50	0
	16,624 trees.	£1281	10

The trees that were taken out at each of these thinnings were severally applied to the following uses, the lesser ones for hop poles, which sold at 2*d.* and 3*d.* each, the others for rafters, ladders, and scaffold poles, and these sold at 6*d.* each. Those which were used for hop poles were found to last from six to eight years.

The trees are at this time in a very flourishing state, are handsome, and of good size, and promise to make fine timber trees.

I am indebted for this information to the proprietor John Thompson, Esq. of Waverley Abbey, who had these plantations surveyed and valued the latter end of last summer.

Would a plantation of the same extent, of oak, elm, ash or beech, of the same number of years growth, be of equal value at this time?

In 1787, Mr. cut out of his nur-
sery 4000 Scot rch, and Weymouth
pines, for hop 14 to 18 feet high,
which he made elf, and his son Mr.
Francis Giles, i at there are some of
the larch and W ne still in use in his
hop garden. He time cut 200 twenty-
feet poles, which he r 27*s*. per 100.

The quality of the soil where these grew was similar to that on Crooksbury heath.

My friend Mr. Davis, of Longleat, who has had great experience in the management and value of the Scotch fir, has in a memoir presented to the Society of Arts, Sciences, &c. in London, of the 2d of January, 1798, the following remarkable statement.

"That the late Lord Bath had for the last 20 years planted upon the average upwards of 50,000 trees a year, and in some years upwards of 100,000 upon land of the value of from 1 to 4*s*. per acre per annum, which, after expending large sums, would not bear corn; and that which was laid down to pasture in the highest state of improvement, became of less value 15 years afterwards, than when covered with heath, as the grass which is now most prevalent is the aira or hair grass.

On the best spots an assortment of forest trees were planted, and a large proportion of Scots firs were planted among them, as well as surrounding them, for shelter to the rest; on the poorest spots Scots firs were planted alone. Upon which he observes that the beeches, oaks, &c. which were planted on the best spots, although nursed up by the Scots firs, will not be so valuable at 60 years old as the Scots firs on the very worst land are at 30.

I also, says he, take this opportunity to remove a doubt which has of late prevailed too generally, that English grown fir timber is of no use. I have had more opportunities of using it of all ages from 100 years growth downwards, than can fall to the lot of most men, and I can safely assert from my own experience, that in all purposes to which deal is applicable, I have found English grown fir equal in strength and durability to any foreign deals whatever. I allow that the Scots fir (although it is undoubtedly the real yellow deal) is seldom of so delicate a grain as the foreign yellow deal, but this is entirely occasioned by the rapidity of its growth, and its having too much room to throw out large side branches. Lord Bath's Scots firs, which are known to have been planted in 1696, are from two to three feet diameter, whereas the best Christiana deal, although evidently 100 years old, is seldom above a foot in diameter; and its knots, which denote the size of its side branches, are small and inconsiderable, therefore evidently appearing to have grown slow and close together. We have a cart house at Lord Bath's which was built about 80 years ago, out of small firs, which is now perfectly sound and upright; and for the last 20 years all the carpenters of the country have used small firs for rafters, &c. with success, and no timber of is more ready sale. The old firs of 1696 are worth from 18*d.* to 21*d.* per foot, and these of 30 years old yield a shilling. Oak trees of 30 years old are not worth above 9*d.* per foot, and bee [illegible] 6*d.* In fact, neither of them can be [illegible] or properly used as such at 30 years [illegible]

It ought also t [illegible] ed that although fir timber is imm [illegible] more per tree than oak or beech of [illegible] e, it will nevertheless grow faster and [illegible] ether than any other trees. Four firs [illegible] here one oak or beech will grow. For [illegible] etter, and deciduous trees the worse, for being crouded.

Scots firs will flourish, and come to great perfection where oak and beech will not grow, and where larch has failed uniformly.

Having cut some rides through extensive plantations of Scots firs, of 30 years growth, the land and the trees were measured exactly, and the following results shew that the profit of planting Scots firs has been full 7 per cent compound interest, whereas no plantation of deciduous trees, within my knowledge, has paid 5 per cent simple interest. Indeed we usually reckon, in valuing estates for sale, that the common growth even of elm timber in its most favourite soils is seldom equal to more than 3 to 3½ per cent, simple interest.

Three hundred and thirty-six Scots firs of 30 years old, cut upon a statute acre, average measure 3 feet per tree, valued only at 10*d.* per foot, viz. 2*s.* 6*d.* per tree, amounts to £42 per acre.

At the time of planting, this land then newly inclosed from common, was not worth above 2*s.* per acre per annum, which at 25 years purchase, for the fee simple, amounts to £2. 10*s.* per acre.

Cost of trees and planting 3 0

£5 10 total expence per acre, supposing the land to be annihilated.

£5 10 principal will increase in 30 years as follows:

At 5 per cent simple interest to only £13. 15*s.*

At 5 per cent compound interest to £23. 15*s.* 5*d.*

At 7 per cent compound interest to £41. 17*s.* 4*d.*

So that the Scots firs, which have increased £5. 10*s.* principal to £42, in 30 years, have paid upwards of £7 per cent compound interest.

From this accurate statement of Mr. Davis's, it appears that this plantation of his lordship's paid upwards of £7 per cent compound interest. But in this plantation on Crooksbury heath, upwards of £12 per cent compound interest, has been made in the same number of years: what stronger proof can we want of the advantage to be derived from planting all the hilly parts of Bagshot heath.

There are Scots firs at Tredegar in Monmouthshire, which measure 75 feet of timber.

That a spirit for planting is not altogether extinguished in this country, the following fact will shew. About the year 1801, John Brickwood, Esq. of Croydon, and a few more gentlemen, pur-

chased an estate of 1000 acres, near Ringwood, in Hampshire, which including the expence of conveyance, &c. did not stand them in more than £3 per acre in fee simple, and being inclosed, the land, it may be supposed, could not be of much value; they contracted with a nurseryman to plant the whole of it, and to keep the fences good, and to replace any dead or decaying plants for five years, at an expence
re. There were, according to the
contract, to be 2000 trees planted
hich were to consist of Scotch an
and some pine-aster. Larch were al
t they have uniformly failed. Mr.
forms me that this spring, viz. 18
em, and to his astonishment, he
the firs near five feet high, and the whole plantation very promising.

In order to have the full benefit of these valueable trees, as to closeness of grain and durability, they must be cut down when the sap is in its greatest vigour, say June and July. The trees should be immediately immersed in water, and then kept until the spring following, when they may be taken out, and piled up for use.

By this process not only is the tree full of resin at that season of the year, but by being thrown into water, it concretes, if I may be allowed to say so, the resinous matter with the wood, condensing the parts, and making the trees one solid body. I understand this is the practice in all the northern counties, with every species of fir, particularly Norway, Memel, Riga, &c.

LARCH. PINUS LARIX.

Monoecia monadelphia. Linn. Sp. Plant.

This tree which has been so celebrated in the natural history of Rome, and other countries, has within the last 30 years made considerable strides in this kingdom towards that popularity, which above all other trees, all things considered, it seems to lay claim to. Fifty years, however, before that time, they were planted as trees of ornament at Wimbledon and Oatlands, and we have many large trees of them scattered over this county at the different ancient seats within it: nor was that celebrated man of taste, Mr. Hamilton, when he formed that beautiful place Pains-hill, and formerly the pride of Surrey, unmindful either of the beauty or the value of larch, since many of them are still to be seen about the grounds.

We have a very recent instance that this tree is rising into distinction by the attention which it has received in the person of his Royal Highness the Duke of York, who has in the new inclosures on Weybridge common, &c. planted many thousands; and which, there is the most flattering reason to believe, will turn to a good account.

The tree perfects its seed in the best manner in that neighbourhood, which I can safely assert, having formerly been accustomed to buy large quantities of it annually, that were collected from the trees at Pains-hill.

I have had strong evidence of the value of it as timber, my father having converted three large trees into plank and boards, about 20 years ago, which were fine and close grained, and, when the house in which they were used was altered, about four years ago, they were as sound and as perfect as the best Christiana deals could be.

Mr. Wm. Pontey, an intelligent nurseryman and planter at Huddersfield, in Yorkshire, says that he lately purchased seven larch trees of about 35 years growth, containing together 199 feet of timber, or about 28¼ feet each tree on an average: they grew upon a thin soil with a loose bottom of reddish yellow sand, in a plantation of oak, ash, sycamore, birch, &c. which, though of the same age, were then so inferior in value that even the best of them would not have fetched eight shillings per tree, and certainly these could not be dear at one shilling per foot; so that there was an actual excess in value of 20*s.* 6*d.* per tree in favour of the larch. An object surely of the highest magnitude in a commercial, as well as in a national point of view.

Its growth is the most rapid of any of the fir tribe, but being slender in its shoot, unless it is planted among other trees, or in a large body, if by themselves, in order that they may shelter each other, they are apt to yield to the wind, and to lose that upright direction and form which is their characteristic. I have always found that trees of every denomination, which grow on the northern and eastern sides of hills, being subject to the coldest and most piercing air, and deprived of the direct influence of the sun's beams in the hotte months, not only grow much slower, are infecte with fewer diseases, and by consequence are stoute and cleaner trees, but the grain is much closer and finer, and the timber more firm and durable than those trees which grow to a southern or western exposure. This is doubtless the reason why those larches, which, claiming the Alps and Appennines and also the cold regions of Russia for their native air, have been enabled to withstand for so many generations the all devouring hand of time.

In Crevier's Paris edition of Livy, we are told, that Hannibal, with a view to melt the rocks, laid the cliffs bare, and heaped up piles of larch for that purpose; the combustibleness of such an immense body, owing to the prodigious quantity of the spirit of turpentine which would then be created, and in the latter of which the tree so much abounds, spread the flame far and wide, and conveyed to the half petrified villagers an idea that those stupendous mountains were literally being destroyed by fire.

To Marcus Vitruvius Pollio, commonly called Vitruvius, a most celebrated architect, who flourished under Augustus Cæsar, and who is known to have improved Rome so much as to have caused this remarkable saying of him, "that he found it brick but left it marble," these improvements so far as they related to the beautifying the city, were to be attributed; and he laments in his works, that they had not at Rome larch timber enough for joists and other parts that required both strength and beauty, as well as for its wonderful property of resisting fire. Among the vast variety of superb edifices which adorned that renowned city, the forum of Augustus, as well as several bridges during the first part of the reign of the emperor Tiberius, were built with this material. And Strabo, who as a geographer was highly extolled in this reign, speaks of trees (which from the characteristic description given of them, were no doubt larch,) which measured eight feet diameter.

Vincent S celebrated Venetian ar-
chitect, who t the year 1580, built
most of the s Venice with larch.

They were rch which the divine
Sanzio Raph f the most celebrated
artists of those e year 1500) fixed upon
to immortaliz and to eternize their
skill in painting se of canvas was known.
It makes the best palats for painters to separate their colours on.

Before Petersburgh was founded, that is before 1703, the Russians built all their merchantmen, as well as ships of war with larch, and I am well informed that it composes the greater part of the materials with which their present men of war are built. The several curious models of ships, buildings, bridges, &c. which adorn the Museum of Peter the Great are made of larch.

Posts and piles, driven into the ground as in Venice, (where it is said the whole city is built on them) become almost as hard as iron, and infinitely more so than oak or any other wood with which we are acquainted, will last a great deal longer, and will bear the most incredible weights. When cut into boards it will bear the finest polish that can be imagined, and I am happy in this opportunity of sending a specimen of it to the Board cut from an English tree, which, although it has been thrown about my study for these two years past, is still sufficiently perfect to give an idea of its capacity to receive it. Indeed, I have often thought that if pieces or pannels of it were introduced as a relief in compartments, polished as high as it would bear, and disposed agreeable to the taste of our first architects, in some of those superb rooms of our most fashionable mansions, the brilliancy of its lustre, reflected by such a profusion of light which is displayed on a gala night, could not fail of producing a most striking effect.

For weather boarding, especially if they are used for roofs of buildings where the sun has great power, instead of slates and tiles, they require no cement or plaster, paint or pitch, as a covering over them; for the great quantity of turpentine which the sun draws out of the boards, forms a most complete cement which becomes impenetrable to wet.

Hitherto we have been speaking of it as applied to the several purposes of the sciences, we shall next consider it as subservient to the arts.

From the larch we receive the agaric. (boletus igniarius of the order of cryptogamia fungi) The purest Venice turpentine, (Terebinthina veneta Lond. et Dub. resina et oleum volatile Edin.) and a species of manna, called briançon manna, exude from this tree, or rather the latter is formed during the summer on the fibres of the leaves, in white friable grains, which the peasants collect and put into pots, which they keep in a cool place. This manna is of a yellow colour, and has a very nauseous smell. The turpentine, however, is procured from the trunk of the tree. Holes are bored during the summer near the bottom of the trunks of the trees, into which small gutters or tubes are inserted to c e into vessels intended to receive it. btained only from trees that are in e old trees very often have consid ns of resin in their trunks.

Professor I at a real gum, entirely soluble in w ed in the Ural forests from larch, a btained by exudation from the inter the wood when it is burning.

The essential oil of this turpentine is officinal according to the Edinburgh pharmacopœia. It is lighter than water, transparent, limpid, and volatile. It has a hot pungent taste, and a penetrating smell, is highly inflammable, (which accounts for Hannibal's selecting this tree for the purposes before observed) and possesses all the other properties of essential oils. Its uses are various, both internally and externally applied; but in the latter it is attended with the greatest degree of success, particularly as an antispasmodic, and as a styptic.

We have in this county, most fortunately for the lovers of planting, but greatly to be lamented by the philanthropist, hundreds, nay thousands of acres now exhibiting the most dreary appearance, on which this plant would grow in as great perfection as it ever grew in the Valais, in Swabia, in Dauphiny, in the forest of Baye in Provence, or in the great forest of Ural. If we cast our eyes over Romping downs, Purbright, Bagshot-heath, Horse-hill, Blackheath, Frensham, Crooksbury, Thursley, Hindhead, &c. &c. we shall find hundreds and thousands of acres of soil which of all others this tree most delights in, and on parts of which the late Mr. Giles has grown them with the greatest success. Oh! that my friend Colonel Johnes or even Colonel Moore were but large proprietors of these valuable heaths, they would soon make a most superb figure. The nurserymen at Bagshot, Woking, Chertsey, and Walton, raise them with the greatest facility, and in great numbers, and from them collectively I have at different times bought many millions of the plants; and as those trees may be said to be raised on the spot, the usual objections of distant carriage, better soil, and milder climate are thus removed, for they are at hand.

ESTIMATE.—In order to give every possible facility and encouragement to the planting of these trees, I beg leave to submit the following estimate to the attention of the public. I am indebted to Mr. Pontey for having prepared it for me, and I entirely coincide with his sentiments thereon.

" For example, an estate of a thousand acres of mountainous land, usually termed barren because of its bleakness, and let for not more than 12*s.* per acre,* would cost at 30 years purchase eighteen thousand pounds: if the purchaser expend one thousand more in planting and fencing one hundred acres so situated as ultimately to skreen the whole, allowing compound interest for that, with the accumulating rent of the land for fourteen years, the estate would then have cost about twenty one thousand two nds; and the account for it, with fo yond that period, may be stated as

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* Note, there are not one hundred acres together on any of those downs or heaths that I have proposed to plant with larch, or the land contiguous for 900 acres more that will average, when let, half that sum.

Paid for the e	£18,000
900 acres imj er 3*s.* an acre, at 30 yea	4,050
Value of 200, y larch, at 6*d.*	5,000
Estate worth at the end of 14 years..	27,050
Cost, as before-mentioned, about.......	21,200
Improvement by planting.............	5,850
Ditto by trees, in 14 years more, at 1*s.* each............................	10,000
	£15,850
Deduct, for rent of 100 acres, at £60 per annum, with compound interest about..	1,175
Estate improved by planting in 28 years..	£14,675

" In making the foregoing calculations, I have made full allowance for the exposure of situation, as it is not uncommon to see larch worth as much money in half the time; but probably, if the whole were suffered to remain to the end of the term, the improvement might not be so great; yet, if the thinning was properly attended to, the value of standing trees, with the produce of such as were sold, could not be less than the stated average, independent of expences, viz. 1*s.* 6*d.* per tree, or £125 per acre."

On parts of these immense wilds that are not so much exposed to the west and south west gales, plants of three feet high might be planted with great safety at four feet asunder, provided they have been once or twice transplanted and stood thin. But in the most exposed parts, plants of four years old that have been transplanted two years and stood thin, such plants will then be from 18 to 24 inches high.

When a south or a south west exposure, or even a bleak northern one presents itself, it will be necessary to skreen all such by a belt of Scotch firs of three years old, having been once transplanted, and a proper mixture of them regularly distributed through the plantation. Wherever sudden rising grounds of considerable exposure take place, and which will be often met with on these downs and heaths, such spots should be crowned with Scotch firs as a proof of their patience and hardiness; the lower sides and the valleys, if dry, may be filled with oaks and chestnuts.

As to the preparation of the soil for those plants, there is very little that I have seen that would require any thing more than opening the holes where the plants are to be set during the summer and autumn months, when labourers are tolerably plenty, about two feet over and the same depth. The turf should be laid in the hole giving it a chop or two across, the grass side downwards, pressed close to the bottom with the foot, in order to make it the sooner rot, and a little of the mould put over it; the remainder may remain exposed, that it may acquire as much elementary assistance as possible. I should then recommend beginning to plant as soon as the weather would permit, witho n a large scale, and unless a great re employed, it would not be comp and before the season would be too I have thus planted many thousan uccess.

The usual ixture of forest trees has always b eet; but I have frequently thought that about 3000 per acre a better distance; I then plant the skirts thick, and assume the proper and more regular distance, as I recede from the outside of the plantation. But as larch would be our principal object in this plantation, I am of opinion that about four feet distances as near as may be, will be quite close enough, and that would require only 2722 trees per acre of Scotch and larch, say about 522 Scotch to 2200 larch.

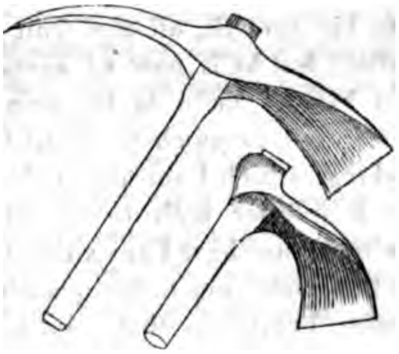
Some gentlemen seem inclined to return to the old mode of planting in straight lines and quincunx fashion, and if I understood Mr. Henry Holland right, (and who had the direction in planting the larches on Weybridge common, for his Royal Highness the Duke of York, and who did me the favour to offer me the contract,) it was the intention so to plant them, and at three feet distances, which would necessarily take 4840 plants. Whether they have been so planted, as I have not been that way since, I am not able to say; nor can I figure to myself the motive for departing thus from modern practices, and resuming one that has been proved by experience to be defective, if not bad, unless it were for the sake of being certain that the number of trees contracted for per acre were planted. Certainly, the objection which has of late years obtained against planting in straight lines, is not so much on account of the uniformity of the thing, (because such plantations are intended and considered in the same light as a crop,) as it is, that it draws a current of air between the lines, which, by being pent up as it were, causes it to rush with so much violence as to produce serious injury to the branches, and ultimately to the trees themselves. Whereas when the trees are indiscriminately dispersed and all lines broken, the force of the wind is every where divided, and no current can possibly prevail to injure either the branches or the trees, yet the air becomes by this dispersion of it more equally diffused through the plantation, than it can be when the trees are planted in straight lines.

Mr. Pontey recommends two implements of his invention as peculiarly calculated to expedite the planting of young trees in heathy soils; the one is very similar to our common mattocks, but made particularly light, with one end about five inches broad, and 13 long, from the centre; the other a small end or pike, 18 inches long. With the former, which must be sharp, we strike off the sod or heath, and with the latter loosen the soil in the place where the hole is to be made, taking out the stones, if large, but leaving the soil.

The other tool we call a planter, the form of which will be best described by the plate. The length is eight inches from the eye; the face or edge four and a half broad, and the handle 12 long. The he [illegible] nd the handle is made stronger than [illegible] neck, and is for breaking any clo [illegible] found in the holes, which, by a [illegible], will be done effectually.

The person b [illegible] with a basket, holding the tree in [illegible] nd the planter in the other, strikes [illegible] the soil about the centre of the [illegible] lling it towards him, puts in the tree with the other; then pushing the earth to its root with the back of the planter, and pressing it a little with his foot, the operation is performed with a degree of neatness and expedition, which the most expert can never attain with the spade. But having had no experience with either of these tools, used as thus described, I cannot speak of their merits. I believe my neighbour Mr. Bradford, of Ashdown park, who is well acquainted with the inventor, has the tools, and probably uses them, as he plants a great deal, having in his nursery at this time more larch than any one man in the United Kingdom, which on that cold, bleak, and exposed situation are found to thrive admirably. His land is, however, that heathy soil which is calculated for the tool, but I question the advantage of the planter in heavy land.

The holing Mattock.



The Planter.

My Lord Midleton planted some larch in the year 1772 in Pepper-harrow park on a gravelly soil; some of these were cut down in the year 1800, having stood about 28 years; one tree cubed 28½ feet of timber, another 27 feet, and the rest from 20 to 25 feet. Are there any trees that at such an age would have yielded so many cubical feet of valuable timber? I confess I do not know of any.

ORCHARDS.

Surrey has never been considered a cyder county, and yet there is scarcely any farms, either large or small within it, but has its orchard, and from which is made more or less cyder. On the south east side of the county, especially in the parishes of Lingfield, Crowhurst, Tanridge, Godstone, &c. there are some large orchards, and there is one considerable cyder maker, Mr. Double of the Moor, a farmer of some eminence in the former parish, who, I un-

derstand, has formerly been the largest maker in the county, having been accustomed to buy in, additional to his growth, all the fruit he could for many miles; but he is now advanced in years, and confines himself more to his own produce. My business is not so much to detail the process of cyder making, which I am sure, if I may judge
by the taste, to the Devon and
Hereford me any thing to do with
the cyder w the quantity of fruit
grown per ac hat point we also fall
very short of ; but my intention is
to describe the the orchards them-
selves, to poin cts in that treatment,
and to offer th which, after the fullest
consideration, has occurred to me.

First, the orchards have in no one instance that has come to my knowledge, in the occupation at least of farmers, been planted with any regard to position; they are perhaps as often to a northern and eastern, as to a southern or a western aspect, and some there are which partake of the several intermediate points of the compass, just as the site of the ground might happen to be in respect to the dwelling house, to the farming buildings, in order to take advantage of their shelter, or on account of the superior quality of the soil,

Secondly, in every orchard that I have gone into or passed by, in some the trees are planted at 20 feet a part each way, at others they are planted at 25 or 30, or 35, or 40, and very few so wide as 50 feet asunder. Some of the trees are nearly blown down, which might have been prevented or rectified at least by timely application and attention; others have been permitted to grow as crooked as rams horns, as if those shapes were either more beautiful, (more picturesque they probably may be,) or as if they were more fruitful for being more unshapely.

Thirdly, in very few instances indeed, are either young or old trees free from those destructive plants moss (lycopodium) and liverwort; (licken;) many of them abound with misseltoe, (viscum) few of them are free from broken and scathed limbs, many of them eaten up with canker, and in no one place do they make it a rule to prune their trees, either young or old, or to lop off a damaged arm.

Lastly, cattle of all kinds, cows, oxen, horses, sheep, hogs, &c, are at one time or the other permitted at random, and at pleasure, to feed down the herbage, (as they are all in pasture,) and if they choose, and can get at them, to brouse on the branches, to bark the trees, and all of them to rub their hides against their stems. And in no instance do the orchards receive any cultivation either by digging, or ploughing, or renewing the soil, either by manuring or by adding fresh soil.

Having thus stated what I have found, my observations will at present be directed thereto.

On the first point we must observe, that an evident want of judgment must have prevailed in the original planters of these orchards; for however it might be desirable to have them as near to the house as possible, yet, if such situations were too low and wet, and could not easily be drained.

too much exposed to the north east or east winds, or not open to the south and west, to admit the sun and air to dry up the damps, and disperse the fogs, or the soil was not fit for it, such situations ought to have been abandoned for some others more suitable; and Varro was so fully satisfied with the propriety of it, that "on being asked what he should do if hi [illegible] cestors had left him a seat in an ill [illegible] ad soil? he answered, why sell it, a [illegible] n good. But what if you cannot g [illegible] th? why then take a quarter, but h [illegible], or any thing rather than live upon [illegible] hence we may infer, that to make a [illegible] ll where from a combination of c [illegible] ittle is suitable, much cannot be exp [illegible] therefore the ground would be better employed in some other produce. Horace had something like this in view when he said

> Caule sub urbano qui siccis crevit in agris,
> Dulcior, irriguis nihil est elutius hortis.

As to the second point it seems somewhat curious, that on a farm separated from another only by a hedge, and in situations as to the compass exactly similar, the trees should in the one orchard be planted at 20 or 30 feet distance, while those in the next are at 35, 40, or 50, and both in a state of pasture. If the latter are only wide enough to give a free passage to the proper circulation of the air, and to admit the benign influence of the sun's rays on the ground for the benefit of the roots, and to dry up all superfluous moisture, and consequently to increase their fertility; what must be the state and condition of those trees which are planted so close together? Again, if the trees which stand so thick are as fruitful as those which are planted so thin, to what cause are we to ascribe the phenomenon? I confess this has often puzzled me in reasoning with the farmers on the subject, and I have not, for some years, passed an orchard without considering it again and again. I offer an opinion with diffidence, and therefore do not pledge myself for its conclusiveness.

When trees are planted at great distances asunder, and in a soil that has been equally prepared through the orchard, the roots push forward in every direction near the surface, and very seldom attempt to go downwards, because they find the greatest nourishment from that which is above; being constantly enriched by the particles of matter which lodge on the surface, and are washed into the ground. This fresh matter (call it what you will) stimulates the roots of the trees, they grow vigorous and fruitful, are attacked by fewer parasitical plants, and last many years longer. The fruit from such trees is always more juicy, yet less crude, and if to this we add proper pruning, there is no question but they will bear a greater quantity of marketable fruit, weight for weight, per acre, and that too without manuring or fresh soiling.

On the other hand, the fruitfulness of trees planted so close together proceeds from something like this cause. Suppose as in the former case that the ground has all been prepared alike, the trees

will flourish so long as they can extend their roots towards or nearly along the surface, without coming in contact with each other; and they grow the faster for being planted so close. When they have extracted the most essential parts of that pabulum which has hitherto afforded them their nourishment, they push downwards in search of something analogou
ey meet with it, their
state of vigour
n, and they flourish;
but if it prove
tree receives a check,
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and vigorous shoots,
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g year less and less
capable of doi
om some adventitious
cause the tree is thrown into a state of bearing, and it arrives at its maturity at a period when those planted at a greater distance have scarcely attained a state of manhood; (if I may be allowed the expression) the one will be fruitful from natural causes, the other, because the juices, having coagulated and being too viscous for the purpose of shoots, become the ovarium or depositary for the future fruit, and produce the buds for that purpose; and I suppose that what may be left after serving this office, is sufficiently attenuated, passes on to the extremity of the shoot, and assists towards producing a fresh one; such fruit is never so large as when the tree is in a vigorous state. The juices being thus altered and thick, the particles of matter, which the tree in a state of vigour inhales more rapidly than in this state, press upwards with the juices of the tree, and now meet

with obstructions owing to the slow motion of the juices; much of it settles on the bark, where it concretes, and becomes a lodgment for the seed of those parasitical plants, which it is reasonable to suppose are always floating in the air, at certain seasons of the year at least. If it was not therefore for these plants, it is possible that such a body of matter might be collected on the stem and branches of these trees as to make the very air of the place offensive, and dangerous in a high degree.

If these trees are properly pruned they will continue to be fruitful so long as there is any stamina in them, but they will wear out so much the sooner for it, as animals that have been very prolific at an early period of life, without having due assistance and caution administered to them, wear out faster than those equally prolific, but to whom all proper attention has been paid.

Again, trees planted thick, though it may be supposed that they skreen each other, and are not so liable to have their boughs broken, or their stems twisted, and consequently to become unsightly, yet the fact is otherwise; wherever trees stand thick they draw one another up weakly, every part of the tree partakes of the weakness. This thickness or closeness of the rows causes a draught and strong currents of air as to a focus; violent eddies are also more frequent. The want of strength in the trees deprives them of the power of bearing up against these eddies, or sudden gusts of wind, and hence they are blown on one side, their boughs are fractured, or they are torn up by the roots. On the contrary, the wider the trees the stronger they grow, the less draught, the fewer eddies, straighter trees, and more perfect boughs.

The reason why they never prune their trees is of a piece with the rest, and is not less curious. If trees bear well without pruning, why bestow so much time and cost in doing that which it appears does not require it, and in the doing of which we are a [illegible] harm as good? I confess the argume [illegible] t ingenious, and if we view it as they [illegible] conclusive; but if we analyze it by t [illegible] erience, we know that the result bea [illegible] em. Why dress your horse after a h [illegible], if it be not to make him healthy? [illegible] the lampass from the roof of his m [illegible] not to enable him to feed better? And why shoe him if it be not to save his feet, and make him travel safer? We know that by skilfully pruning a tree it will come earlier into bearing, it will be more fruitful, and continue longer in a productive state; and what is not the least beneficial part of the consequence, the fruit will be all the finer for the operation. And because by so doing, we admit the air to pass freely among the shoots, to make them more elastic and firm, and the sun to ripen the wood, the buds and fruit also; which never can be the case when the boughs and branches cross each other in every direction as close as possible, thereby rubbing off the buds and the bark by the friction, producing canker, and as certainly decay; preventing the fruit from being either so well coloured so soon, and so well ripened, or so well flavoured. The all wise Providence gave us the rude tree, and we were to improve it.

If we take care to prune trees while they be yet young, and to train them up straight, there is no fear of their departing from it as they get old, if they are assisted from time to time with the pruning knife.

And as to the last position, that of suffering cattle of every denomination to depasture in those orchards, it is done with a view to dress it, and keep it in pasture, with the very careful idea that in case the fruit fails, the grass pays. But I question much the propriety of laying down orchards to grass, because we are sensible from every day's experience in the kitchen garden, that cultivation improves every thing. By cultivation I would mean the frequent digging, ploughing and moving the ground, neither of which can be done while it is in pasture; in this opinion the great proprietors of orchards in Hereford, Worcester, and Kent, agree; for they almost invariably keep them under the plough. I prefer the spade or the fork to the latter, at least among the trees, and as far as their roots extend, because, if the roots of any of them happen to run near the surface, the plough lacerates them, tears them asunder, and leaves them mangled and mutilated, whereas the spade or fork cuts them clean either perpendicularly or diagonally.

By keeping the land eternally in grass, we increase the compactness and solidity of the soil, prevent the free admission of the nitrous particles to the roots of the trees, which the grass deprives them of, or they are washed away, and we cannot be sure that we do not extract more from it, through the medium of the grass, than we return to it.

In a course of aration, however, we frequently manure for some of the crops that we intend to put in, but if we did not, but only stir the ground, the trees would still derive essential benefit therefrom, inasmuch as the earth would then be prepared to receive every adventitious matter which might descend or be co [illegible] would be readily conveyed to the r [illegible] as plants are attracted by light, it is [illegible] it may not have some influence on t [illegible] any rate they would participate in [illegible] uence of sun and air.

Again, if th [illegible] supposed to pay the rent and taxes [illegible] d, interest for the capital sunk, and [illegible] e profit, communibus annis, for skill and attention, (if there is either displayed) what more can we expect from it? Why lay a heavier burthen on the land than it ought to bear? Why not treat it in the best manner possible, by keeping it in that state which is likely to be the most beneficial to the crop on it?

By keeping it in a state of aration we necessarily exclude cattle, so that we run no risk of injuring the bark by knawing, brutting, or rubbing against it; or which is nearly as bad, besmearing it with the saliva and mucus, which stops up the pores, and which collectively are among the most serious evils that can befal trees of any description.

In the formation of an orchard, the grand arcanum seems to be, to place it in a situation where the most boisterous and severe weather is naturally, or can be artificially, broken from it; that it is neither too elevated nor too low, but where the sun and air can have free access to it;

that the soil should be naturally or artificially good, neither too stiff nor too light, by no means wet, and of sufficient depth; and the farther removed any of these requisites are, the less success we must expect. I remember discoursing with my friend Mr. Davis, of Longleat, on the subject of orchards, some years ago; and as every thing is of consequence which comes from so able a man, I was used to minute down the heads of our conversation. On referring to my minute book, (of which I always carry one about me) I see it noted down as his opinion, that the proper situation of an orchard is a north west exposure. Every book that I have read on the subject from Hesiod to Evelyn, and from Evelyn to Forsyth, advise the aspect to be south and south east. I have to lament, that among the other matter which the note contains relative to orchards, that I did not take down the reasons which I have no doubt he gave for this opinion. But in looking into Count Rumford on the propagation of heat, I met with some reasons which probably may be something analogous to those of Mr. Davis.

In page 462, Vol. II. "The cold north west winds, which prevail upon the coast of North America, during the winter, seldom extend above 100 leagues from the shore, and they are always found to be less violent, and less piercing, as they are further from the land.

"These periodical winds from the continents of Europe and North America, prevail most towards the end of February, and in the month of March; and I conceive that they contribute very essentially

towards bringing on an early spring, and a fruitful summer, particularly when they are very violent in the month of March, and if at that time the ground is well covered with snow. The whole atmosphere of the polar regions being, as it were, transported into the ocean by these winds, is there warmed and saturated with water; and, a great accumulation
sea, being the necessary consequen
continuance of these cold winds fro
pon their ceasing, the warm breezes o
ssarily commence, and spreading then
ie land far and wide, assist the retur
smantling the earth of the remains of
rment, and in bringing forward into
manifold beauties of the new-born year.

"This warmed air which comes in from the sea, having acquired its heat from a contact with the ocean, is, of course, saturated with water, and hence the warm showers of April and May, so necessary to a fruitful season."

How far this reasoning may be conclusive as it applies to our subject, may be matter of controversy; it is the language (as far as I am able to appreciate it) of a man of science and a philosopher, and has not been adopted on light grounds.

That orchards are of great consequence to the community cannot be denied; they are so considered by the legislature, since no less than 19*s*. 2*d*. is paid to the excise per hogshead, by the first buyer of either cyder or perry. To render them as subservient as possible to the purposes required of them, ought to be our great aim. It was formerly accounted the greatest happiness to have fair and pleasant orchards, as they were said to be in Thessaly and Hesperia, and Cicero (de Senectute) describes it as the chief part of husbandry.

I am well convinced that an orchard properly situated, properly planted, and properly taken care of, will not only maintain itself, but will yield infinite profit; and I am persuaded, that if men would but be instructed in performing these three desiderata, or even the last of them, and would feel the profit and pleasure thereof, they that have no orchards would have them, and they that have orchards would have them larger; not, however, by making another small one in another place, but by adding to, and increasing the size of the original; for in a great orchard much labour is saved in fencing, and the trees are a natural skreen to each other, as far as respects their internal situation; since three little orchards, or a few trees, being as it were, cooped up, are eternally subject to blights, owing to the quantity of confined and stagnant air, generating miasmas from the quantity of vegetable matter usually deposited there, which invite the whole tribe of insects incident to such places, to the serious injury of the trees or their fruit. It is evident, therefore, that it is the most economical plan, to increase the orchard to six acres in one piece, rather than to have the charge of keeping up the fences round three inclosures.

But, says the tenant, I found three orchards so situate, and although I am now convinced it is wrong, yet my lease is too short, or my covenants will not permit me to follow your instructions. It would therefore seem rather to be the business of a landlord to make such permanent improvements as these, and charge the farm with a per centage for the outlay of the money; because even upon a 21 years lease, which a tenant may have just entered upon, to prepare the ground on a good scale, and to do it as to purchase and plant the trees, with to them for the first ten years, it wo t that number of years before they co d to be in any regular train of beari any rate, the produce cannot be la time, however, he is adding to the and receiving little or no interest, wh is running out faster perhaps than the got into condition to repay him; whereas the landlord receives an interest from the day in which the work is begun. In fact it is a permanent improvement, and as such ought to be made at the expence of the landlord.

In forming the orchard, a man ought to consider well for what purposes it is to be designed,* and having settled that point, a plan of it should be sketched out, no matter how rough, putting a numerical figure to the place where each tree is to go, which is to correspond with the number on the list: then draw out on paper a list of the kinds of fruit intended to be planted, numbering each tree. In doing this, great regard must be had to the growth and tenderness of the tree, since it would be absurd to plant a sort of fruit tree, whose habit is delicate in the most exposed situations; and equally absurd it is, so to mix the tall spiral or rude growing trees among those which are known to grow dwarf and round-headed; and yet, these circumstances are not the least attended to even in Kent, where the farmers are as much enlightened as in any county that I know of.

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* Whether for making of cyder, perry, or both, whether to dispose of the fruit, or to consume it within himself; and he must also consider the sort of market he means to send his fruit to, if he sells it.

My plan would therefore be this: if the orchard ran north and south, or north-west by south-east, begin with the dwarfest growing trees across the ground, beginning at the south or south-east end; and rise progressively in their heights in the manner of an amphitheatre, finishing with the tallest growing trees at the north or north-west end. At a considerable distance from the last row of trees, at this end, say 80 or 100 feet, but 150 if there is room, plant a thicket of sweet chestnuts, walnuts, services, filberts, firs, and other fast growing trees, about two rods wide, and among these you may mix cherries, damsons, bullaces, and a few apples and pears, as temporary trees, in order that they may be handy to replace any of those in the orchard, which may die or get injured; such a thicket as I am now speaking of, will draw up the chestnuts and walnuts (which, with the services, are for the abiding crop) quick, and by growing fast, they will be straight and clean; and when they have got to that height of stem which may be desirable, begin to thin out and take away the firs and other trees regularly, a few in each year, which will let in the air insensibly, and make the walnuts and chestnuts hardy and strong. And those trees which may be taken away will pay all expences that you may have been at. Some of the same sorts of trees should be dropt along the east and west sides; thus we should produce shelter with profit.

To conclude.—In planting the orchard, let me strongly recon planter to spare no pains in prepa ind properly at first; let it be double least two spades deep, or trench-plou bearing in mind, that upon the prop of this work, a great deal of the succ ces will depend; and that he never good a finish of the work after the t ed as he could before, and unless he does it, their want of vigour will always be reminding him of it; let him only consider that it is not like a crop of grain, which in twelve months we are able to settle our profit and loss upon, and about which we may do better the following year, and justly reflecting on that good old saying, "that the thing which is not worth well-doing, is not worth doing at all," will make every sensible man a convert to my doctrine I have not the least doubt.

If the soil is not quite so good as we could wish, endeavour by all means to make it so, before you begin to plant, above all things avoid deep planting, or rather planting in a hole, about which the circumjacent ground is not equally loose, or else you may just as well plant them in a tub, for the loosening of the mould there will draw all the neighbouring waters into it, and the soil will be always poachy and cold. Keep them well above ground first, for as the ground will [illegible], so will they; rather raise a mound about them, than let them be in a dish; be sure to keep them securely staked upright, and let the roots be shortened, and the head cut in before you plant; keep them regularly pruned, the same as if they were in a nursery and intended for sale, as often as you can conveniently, but at least once a year; be not sparing of your knife; let the ground be stirred about them every autumn after the leaves are fallen, turning them and the weeds under; keep the whole ground free from every species of weeds, which only harbour vermin, breed distempers, and impoverish the ground. Remove every appearance of moss and misseltoe, attend to external wounds and canker, timely applying Forsyth's composition; suffer no cattle to be in the ground, but when at work; take especial care of the fences, and I flatter myself that an orchard so treated will at all seasons be not only a handsome sight, but the trees will flourish, and that will make the planter rich.

> Blossoms and fruits at once of golden hue
> Appear'd, with gay enamel'd colours mixt:
> On which the sun more glad impress'd his beams
> Than in fair evening cloud, or humid bow,
> When God hath shower'd the earth; so lovely seem'd
> That landscape: and of pure now purer air
> Meets his approach, and to the heart inspires
> Vernal delight, and joy able to drive
> All sadness but despair, &c.
>
> MILTON'S Par. Lost.

Note. The smallest growing trees should be planted at 40 feet, and so increase to 80 feet, as the size of the kind is known to advance.

ROADS, TURNPIKE AND PAROCHIAL.

It is admitted by all writers upon the political economy of every country, that the state of the public and private roads thereof, or which is the same thing, the facility with which its intercourse is kept up between the one place and the other, are among the first criterions of its wealth; and that in proportion as these are either good or bad, so may the extent of its civilization and commerce be judged of.

In England we have laws framed for the management of these roads, but upon different principles; under the first, the turnpike roads throughout the kingdom are placed under the guidance and controul of certain trustees for the benefit of the public; and under the second, all the parochial roads are placed under the superintendance of persons chosen by their respective parishes. The former having been originally named in the act of Parliament, which authorizes certain roads to be made turnpike, are commissioned to fill up every vacancy that may arise, by death, removal, or any legal disqualification; by appointing a successor out of the district in which such vacancy happens, or in case of there being no fit person within that division, then one is usually chosen out of the nearest, in order that the number of trustees may, as near as possible, be always complete.

These trustees are invested with a power to demand a stipulated sum or toll for every horse, carriage, beast, &c. &c. passing over those roads, and upon which, at certain distances, are erected gates, which are called turnpike gates in England, and correspond with the term barrière in France; where these sums or tolls are taken before any thing is suffered to pass through that is liable to pay. The money thus collected is paid into the hands of a general treasurer for a certain part of the county, who distributes particular portions thereof to the district or sub-treasurers, all of whom are chosen from among their own body, and in proportions conformable to the limitations prescribed by the particular act or acts of parliament made for such county. These tolls are generally let by auction or by private contract, the purchaser paying always such a proportion of the stipulated sum in advance as the trustees may require, and the same proportionate sum of stipulation every month during the term of the contract; the contractor is also at the expence of collecting them.

These several treasurers appoint a person whom they dignify with the title of surveyor, but if he were called supervisor, inspector, or overseer, any of these appellations would be more appropriate, since not one in fifty of them know any thing of surveying. The surveyors or over-lookers, employ day-labourers, set them their several jobs, order the digging of gravel, hire teams for the carriage of it, and fix the spots on which it is to be laid.

From this slight view of the subject it must be evident that great power is invested in the hands of the t istees, who delegate no small portion of it to the treasurers, and who in their turn, confer a considerable share of that power in the hands of the surveyors. For let it be understood, that they are entrusted with the very extensive and extraordinary authority of entering into any man's ground which is not a park, an orchard of many years standing, garden ground, or nursery, to seek for and to dig gr hould be any, paying to the owner th stipulated sum named in the act, oundage for the land broken up an , which by the bye is a very partial ct; and I am afraid is sometimes m answer very malicious purposes. B the owner of a park, which is gene e less value in an agricultural view, and consequently less productive to the public, be excused from supplying the necessities of the road, and who can better afford a few acres to be spoiled, than the man who has but two or three acres, perhaps barely sufficient to keep his horse, his cow, or his little ewe lamb, I cannot conceive? This man's land is, therefore, to be entered upon and destroyed, perhaps, at the caprice of the surveyor, because it contains gravel, (if he has not interest enough with the treasurer or the trustees at a quarterly meeting, to prevent it) when a park abounding perhaps in the largest and best gravel, and which may contain from 3 or 400 acres, to as many thousands, is excluded. Does such a circumstance as this give foreigners any favourable ideas of our boasted principles of equity and liberty, when one law says, every man's house is his castle, and his land being also equally sacred, while another disproves it?

That orchards, gardens, and nurseries should be excused is but reasonable, and may perhaps be deemed sound policy; because they would be infallibly ruined, and the ground ever after be rendered incapable of producing either the crops of the one or the other, unless it happened to be so situate as to be within the compass of some such place as the metropolis, where manure and rubbish could at all times be obtained, and then probably the expence attending it would be greater than the future value could ever compensate. For although the ground may be left as level as it was before the gravel was dug out of it, yet it is notorious, that through the carelessness of the diggers, perhaps one-half and oftentimes two-thirds of the top soil, which they call callow, and which ought to be carefully laid aside, is intermixed with the siftings of the gravel, called hoggins, or is buried at the bottom of the pit; the latter is the more usual way, and which they will always do if not constantly looked after by the proprietor or his people, because it saves them the trouble and expence of wheeling it away.

The parish roads I have said are under the superintendance of persons chosen at Easter, at the vestries of the several parishes, and are likewise miscalled surveyors. The pwoers with which these persons are invested are not much inferior to those appointed by the treasurers of the turnpike roads, in some instances, and in others they are greater. They can enter grounds already broken up, and they can break up commons and wastes, and dig for gravel; they can employ people to collect the stones that may be found on the arable part, as well as on the lay part of a farm, provided the former is not in corn; and these stones or flints they do carry away, only paying a very small compensation for them, and in some parishes without paying any thing at all; they can employ labourers, hire teams, and demand a certain number of carts, waggons, horses, oxen, and men, on certain days in every year, most convenient to themselves, from those who keep them; and from those who do not keep any, they require a sum of money, which is levied by a pound rate as a compensation in lieu thereof. This is called statute duty. They account for the disbursement of this money, and the application of the whole of the duty to the vestry on the following Easter, when the period of these officers' duty ceases; but their accounts are not finally settled until they have appeared before certain magistrates to verify on oath to the truth and justness of them.

Having thus briefly stated the nature of the two offices, we will next examine the persons who in general fill up these situations; and wherever we can find any thing like system in the executive part it shall be pointed out, making such remarks thereon from time to time as the good or bad effects of such system may appear to warrant.

In what I am about to say, if any part of it should bear hard upon any individual, I beg to premise that I have a duty to perform which is paramount to every other consideration; I look to measures, not to men, and therefore if any of them are displeased, and find that they are incompetent to the task they have undertaken, I would advise them to withdraw from the responsibility of the situation; since there is more true honour in making a good and timely retreat, than in pertinaciously adhering to plans, and in holding a situation, in which from the want of the necessary capacity they may have failed of success.

In tracing the system under which the roads are kept, I am aware that I have much to combat on the score of prejudice, and that it is impossible to introduce any thing really useful, however evident it may appear, without clashing with the interests of some individuals, whose sole aim may be to preserve the state of things actually existing. Wherever, therefore, I find a road defective in any part of the county, I shall make a pause, and enter into an examination of the cause, particularly if those defects are glaring; having done this, I shall point out what appears to me to be the most natural remedy, and if I should be right in my suggestions, it is to be hoped that good sense will get the better of bigotry, and no longer suffer a system to be pursued that is proved to be founded in error. For it ought not to escape the knowledge of the trustees, that, as the servants of the public, although in this capacity they receive no pay, yet they are not only bound to economise the funds, whatever may be their extent, which they draw from the public, but they are also bound to arrange those funds in such a manner, as that the purposes for which they were raised may be completely answered.

If they perform not this, they commit a breach of their duty, they trifle with the public, they break through their contract, and every sum of money afterwards expended for the new making of those roads is little short of robbery. All that is now said upon this very interesting subject is little in comparison to what a writer more enlightened and intelligent than have said. But I have mentioned eno object, and for the reflection of th more immediately interested.

By the seve Parliament made and passed in the 4t he 10th of Geo. I, and the 10th and II, and also by certain Acts of the 11 . and the 21st of Geo. III. certain roads therein named within the county of Surrey, and one to Witch-cross in the county of Sussex, were placed under the direction and management of a certain number of noblemen and gentlemen therein named as trustees for the public. These trustees name one principal or head treasurer, and a certain number of sub-treasurers, through whose hands all the money that arises from the tolls pass, each of these treasurers have one surveyor under them, and this person appoints a labourer to act as foreman.

It so happens that not one of these treasurers out of 40 or 50, throughout the county, either systematically or practically knows any thing of road making; the persons employed by them as surveyors are frequently some old servant, a coachman for example, a bailiff, and now and then a gardener, a decayed tradesman, perhaps a plasterer, a bricklayer, a carpenter, a chandler, a shopkeeper, a baker, a waiter at a tavern, or such as have been in low and servile capacities, who, through interest, or motives of charity are thought deserving commiseration; but persons who may be properly qualified, and of course, who may be suspected of starting their opinions in opposition to those of the treasurers, in points where practical knowledge would give weight to such opinions, would be found, in general, unsuccessful candidates in the appointment to such a situation. Let us take a survey of the surveyors in this county, particularly those who have graced the employment within ten miles of the metropolis, and I think I see nearly every one that I have just described; indeed, I will pledge myself to prove, that within the last ten or fifteen years, every one of these characters have at one time or other held the situation of a surveyor of the turnpike roads.

Let us next in rotation turn our eyes on the treasurers within the same distance, and during the same period, and then the wonder that these unqualified surveyors were thus appointed will cease to be matter of surprise. A Russian merchant as the head treasurer, one or two brandy merchants, a starch manufacturer, a timber merchant, a West India merchant, a linen draper, a brewer, an attorney, a clerk in the navy office, and an East India agent: now each of these are, and were no doubt, in their several stations highly respectable characters; but in this instance, we can only look upon them in their public, and not in their private capacities; and therefore I ask, what can men whose minds have been confined from their youth up to the counting house, &c. and to the amassing of fortunes, and whose time may be still occupied in the same pursuits, what can men, I say, so habituated, know about road making, even if their g bove the confines of the desk ? Can emselves to the idea of devoting their drudgery of superintending occasio irs of a road ? There are great and in all professions, but these requisites ays preferred; but to bring the mat me, what great improvement has asurer made on his division of the road with an unlimited I had almost said, but certainly an immense allowance at his disposal, under the direction of a plasterer for his surveyor ? What did his predecessor (and who was perhaps as useful a man take him altogether as the county has had,) ever do, that could be called a substantial benefit to the road, after he appointed one of his tenants, a market gardener, his surveyor ? What good did the late Mr. Baldwin, or the late Sir Abraham Pitches, when the one appointed his own gardener, a poor ignorant good tempered creature, his surveyor, and the other his bricklayer ? What advantage was gained to the public by appointing a linen draper the treasurer, when, from the clamour that was continually made about the bad state of the Clapham road, not only by those who were unfortunately obliged to travel upon it, but also by repeated paragraphs in the public prints, Mr. Baldwin was obliged to resign, and his successor appointed a boy who had scarcely ever seen a road, and had no more knowledge of it, as a surveyor, than an Otaheitean? nay, when they undertake to make the road (about which only *three surveyors* were employed) for £1000 as perfect as Mr. Baldwin (if he had ever done his duty) ought to have left it, it was proved to them to my knowledge, that it could not be done for £2700, and the road, imperfect as it now is, has actually cost £2339. 18*s.* over and above the allowance of near £300 per annum. What advantage have the public ever reaped since old Mr. Thornton's bailiff was appointed surveyor of the Croydon division?

If any man will prove to me that these roads are, and have been kept in the highest possible order, they will do well to do away my assertions, and rescue these parties from the charge of ignorance and incapacity. I am by no means an advocate for invective, but if to speak out, and to narrate facts, be construed invective, I can only lament that there has been so much room for the detail.

But I have been told by some of the treasurers that they do not feel themselves accountable for the mismanagement of the roads under their jurisdiction; they are only answerable, they say, for the money they receive, and the paying it away for work done and materials had, the disposing of which rests with the surveyors; but the latter, when applied to, get rid of the responsibility by alleging that they only act by, and according to, the instructions which they receive from time to time from the treasurer of that division, who, perhaps, appointed them. Thus is the responsibility shifted from the one to the other, until they would fain persuade you that responsibility was out of the question. Therefore, between ignorance on the one hand, and the absence of a positive controuling power on the other, most of our public roads which l [illegible] ropolis, and especially those which [illegible] bills of mortality, and some towards [illegible] of the county, which will be notice [illegible] er places, are in many places in such [illegible] g the winter season, as to be many, n [illegible] ost impassable, while very large sums [illegible] their support; in the east half hun [illegible] n alone it amounts to upwards of £ [illegible] annum, of which Mr. Samuel Thornton, as the head treasurer, seldom holds less than £3000. It is indeed a notorious fact, that at the time the Clapham road was indictable, and many persons had nearly lost their lives thereon, the then treasurer Mr. Baldwin had 5 or £600 in his hands, which it appeared no inducement could tempt him to part with, indeed some of the trustees themselves said repeatedly that it looked as if he was determined to see how bad the road could get, as he scarcely put any gravel on it, either to fill up holes or ruts, and his surveyor did not dare to put on any without his orders, although he often lamented his want of power. The day-labourers were so old and infirm as generally to be almost past labour.

As to the parish roads, many of them in this county (and we are not singular in that respect) are infamous; the persons who are appointed to the management of them, are generally from among the lower order of shopkeepers, and small farmers; their object is therefore to give themselves as little trouble as possible, and if none of these roads happen to lead to any gentleman's house, in the worse order and the more impassable are they, and the lower will be the rents of the farms. The shopkeeper, having his dependance pretty much upon the farmers, thinks if they are satisfied with the condition of the road, it is not to his interest to make a stir about them, even if he were conscious that it was his duty to do it, and that his capacity was equal to the task. And as to the farmer, the less trouble he gives his brethren in the performance of the statute duty, the less will be required of him when he is out of office. Thus then, do we see appointments of trust and of the highest consequence to the agriculture, the commerce, and the convenience of the public, filled by persons in some instances utterly incapable, and in others determined to frustrate the wise intentions of the legislature, by keeping the roads as bad as possible; and who are not to be persuaded that it would be to their interest that it should be otherwise. How often do we find one man of greater capacity, with more enlarged ideas when in office, striving to rectify the mistakes of his predecessors, and resolved to leave to his successors a specimen of what may be done by perseverance and attention, who, instead of following up with the same spirit what his predecessor may have left undone, suffers the whole to go to ruin; that this is the case, every man conversant with country affairs cannot but be sen-

sible. It has been so in the adjoining parish of Lingfield, where, if it had not been for the perseverance of Sir Thomas Turton, the road from Godstone through Lingfield to Edenbridge, would during the winter six months be almost impassable. Let any man accustomed to good roads follow me
through Burstov harlwood, Ockley, to
Rudgwick, Oke l, Ewhurst, Cranley,
Hascombe, H nsfold, Chidingfold,
Godalming, 1 rsley, Witley, New-
digate, Capel, (stham, Chaldon, Tan-
ridge, Crowhur mpsfield, Addington,
Warlingham, (ldingham, Tatesfield,
Titsey, Ewel, andsworth, Camber-
well, and Peckham, during any of the spring months, and he would be ready to conclude that he was got into some of the most inaccessible and uninhabited parts of Ireland. In saying so, I do not mean that every one of these parishes are equally bad, but I do say, that some of these near the capital are shameful, and that the farther we go the deeper we get into the mire. Who would believe that it was necessary within 30 miles of London to take a guide; and that with good horses, we had much difficulty to ride six miles in four hours, and yet that was literally the fact in going from Ockley to Rudgwick, and a great part of that distance we were in danger of being swamped.

Thus we see how many of the parish roads are kept: I have travelled them on horseback and on foot several times during this survey, and I am not unacquainted with the reason which is assigned why many of them are so bad, and that is the want of materials; but if hard gravel is not to be had within a short distance, it ought to be sought for farther; and in case there were none but at a very great distance, they might have made a substitute by burning their impervious clay into bricks, before the duty took place, and they might also lay their roads into proper form, provide drains and carry off the water, though there should be no hard materials at all laid upon the road.

Sir Thomas Turton has undoubtedly deserved great praise for what he has done respecting the roads; it is not every gentleman who will risk his popularity, and make himself obnoxious in a parish, by preferring indictments against this or that road, but he took a method which answered every purpose without his being seen in it, which was, to state to some of his brother magistrates the condition of a certain part of the road which was perhaps in a very bad state; when the high constable of that hundred came to report at the quarter sessions that all was well, he was instantly closely interrogated as to this particular road by some of the magistrates, as the man might not be prepared on oath to answer this interrogatory, he was sent back with a reprimand, that unless he saw that road properly repaired, and all others within his cognizance, they would levy upon him all the penalties allowed by law; this man, therefore, for his own safety becomes surveyor, or at least sees that the parish does its duty properly.

I have endeavoured to ascertain the amount of the sums levied by the tolls, as well as those which are levied by the parishes under the denomination of composition for the statute duty, together with the value of such part of the duty which is performed by personal services, and I think that for England and Wales I am below the mark at estimating it at two millions sterling; but as I choose to err on the right side of the question, I will for the sake of the [illegible] it at one million.

At that sum [illegible] see how much is committed to a clas [illegible]-tenths of whom I will venture to pro [illegible] nothing of the business they are en [illegible] rform; and if that is the case, is it n [illegible] some other mode is not devised to p [illegible] upon a better footing? and I do not he [illegible] that whenever that is done, all the road [illegible] it the kingdom would not cost half the grand total they now cost, and every road should be in better condition than it now is.

I see no great difficulty in effecting this: let all the roads, parochial and turnpike, be examined and surveyed by competent persons (who have no interest in practising a deception) throughout the kingdom, and let them give in upon oath, a valuation of every description of road, distinguishing turnpike from parochial, particularizing every mile in their estimate, and describing the state of each parochial road, its computed or determined length, its traffic, the sum it would take to repair it, and what it would cost to keep in repair de anno in annis.

When those estimates have been delivered in, a true state of the country may possibly be ascertained, (I say possibly, because, if such a survey is to be performed in the same farcical way in which part of the county of Surrey was done this time three years, by a party of trustees in their carriages, with their surveyor perhaps in his, not one of whom knowing more of the subject than the paper I am writing upon, it had better not be attempted,) and when ascertained, let a bill be brought into the houses of parliament, vesting the whole in the hands of government. Let a certain number of persons properly qualified, whether surveyors or not, but if they are so, they would be to be preferred for reasons which must be obvious, because in case of the alterations of roads by the going through other property, they could readily ascertain the quantity required, and the value of it, without any additional expence to the trust.

These inspectors or surveyors should have charge of certain lines of road, with all the intermediate parishes, so as to give them at all times full employment; let them be appointed by the freeholders and copyholders at large in the county, or by the magistrates at large. Let there be one comptrolling surveyor for each county, to see that each subordinate one does his duty; this man to be a person of great experience, and appointed by government. The inspectors to order every thing, but to pay nothing, to make up their accounts monthly upon oath, stating the separate condition of every part of their road which might soon be filled up on printed formulæ, and these transmitted to the comptrolling surveyor, who should give an order upon the treasurer of that division for the payment of the several bills. The accounts of the turnpike roads and the parishes to be kept clear and distinct.

In case the tolls in the first instance should be inadequate to put those roads in proper repair, government might advance the money upon the credit of the tolls, or money might be raised, as it is now, upon the security of the tolls from private persons, and th [illegible] be made equal to the extreme charge [illegible] irs, with a sufficient surplus to liq [illegible] s, and to create afterwards a fund to [illegible] ny emergency.

The parish [illegible] be made good by a pound rate to b [illegible] the hundred, for this reason, there ar [illegible] poor parishes with a great extent of [illegible] at one season of the year or other have [illegible] deal of traffic upon them, and with few or no materials to repair, and there are many rich parishes sometimes in a hundred where their roads are of short extent, and with little comparative traffic, particularly where large towns like Croydon, Kingston, Guildford, Dorking, and the like happen to fall in them, and where good materials may abound; as these towns are supported by the country, and not the country so much by them, it is but fair they should reciprocate and assist each other, since it appears that by depending upon each parish to maintain its own roads, when another which pays nothing towards its support may be the most materially benefited, it would be a hardship upon them therefore to be saddled with the whole expence, when the adjoining parish may from its situation be obliged to traverse them to get to market, &c. when the suffering parish could not from situation retaliate, if I may be allowed the term.

Statute duty being thus done away, there would be no grumbling about the inconvenience of partial repairs, which are often done by particular surveyors at a great expence to accommodate themselves, and then beyond their own property do nothing. That would not however be the case with the plan I am submitting, because the inspector would have no such interests to arrest his attention, and make him swerve from the proper line of his duty, and having the comptroller over him to give an account of his proceedings, and who from one party or another would be sure to hear of any improper conduct, and would necessarily see into it the moment a representation was made to him, I think it is not probable that such circumstances will often happen. If the inspector was found to act improperly, the trustees should have power to remove him; and if they would not do it, after the case had been clearly made out, it should rest with the executive government as the dernier resort, whose measures would be prompt, because in a case of civil polity like this, they would be the most interested, or it might be decided by the grand jury; but the former would be the most summary mode, because, while they were waiting for the quarter sessions, the business of the country might be standing still until the point was decided. But as these would be matters of regulation, they would necessarily offer themselves when the whole plan came to be digested and arranged.

It should be a part of the bill, and great stress should be laid on it, that every person offering himself a candidate for the inspectorship, should undergo as scrupulous an examination, as to his knowledge of the business both in theory and practice, as if he were qualifying for a surgeoncy to a regiment, or to be admitted to a lieutenancy, after having ser me as a midshipman, on board a king's comptroller being the public examiner ommittee of at least seven of the tru he whole may be present if they plea rty to put interrogatories. No man who has a sense of shame would pr mit to such an examination before e permitted to offer himself a candidate office, unless he was sensible he was duly qualified; and it would induce many a young man to study a science, of which there are very few indeed, who act now as surveyors, know any thing about.

I offer these hints as a mere outline of the plan, the detail or minutiæ of it would lead me too far; but as all improvements are progressive, when the whole subject should come to be maturely considered, such alterations or modifications might be introduced, as in my opinion might not only render the design very feasible, but perfectly practicable, and infinitely superior to the one now acted upon.

We will now examine the system that is usually pursued, and I will take the Clapham road as a model, and state how that was done in the year 1800. And first, it was agreed at a meeting of the trustees, that a Mr. Collins out of Kent, somewhere near Maidstone I believe, a road maker, should examine this line of road, which, by an accurate survey taken by me, amounted to two miles and four furlongs, and furnish them with a correct estimate of what it would cost to put that road in all its parts into complete and substantial repair; this gentleman, after having taken his view, reports to the committee of trustees, who were appointed to manage it, that it would cost £1000, and not more; some of the trustees who were present, having mentioned it to me the same day, and asked me what I thought of it, I off hand said it would cost between two and three to do it properly. This being represented to some of the rest, it was agreed that another person should be employed to look over it, and that I should do the same; this other person was a Mr. Wildgoose, who formerly had lived as servant in Mr. Thornton's family, and who was, and is, the surveyor of the Croydon division of the turnpike road. The committee being met and very fully attended, I was first called in, and I presented them with a plan of the old road, in which was described the elevation of the several parts of it above the level of the common water mark in the ditches on each side of it, where there were any, shewing also the height at which the water rose at any extraordinary floods, and describing also those parts of the road which were under the lowest water mark. The width of the old road was laid down in its several contractions and enlargements; every building, with its distance from the road was noticed, as well as the declivities and acclivities, and nothing was omitted that could tend to elucidate the subject. When they had thoroughly examined the plan of the old road, they were referred to the plan of the new road, which by contrasting and comparing with each other, they could see what was proposed to be done; with these plans they expressed much satisfaction, as it appeared I had taken a great deal of pains. I then [illegible] em with two estimates, the one raising [illegible] such a height as that the sides shoul [illegible] in number of inches above the hig [illegible] rk, and the crown of the road so m [illegible] s to produce a certain degree of con [illegible] le to the section which was also drawn [illegible] n; and the second estimate was to n [illegible] spects the same as the other, but not so [illegible] sufficiently so to keep the road sound and dry at all seasons, and in all weathers, but would not keep it so long in repair as the other; the lowest of these estimates amounted to £2731. 7*s.* which included every thing but my time, of which I offered to make them a present. The other estimate amounted to £3501. 2*s.* 6*d.* giving them also my time. As I made no secret of these estimates, I shewed them how the same were prepared, the number of loads of gravel that would be consumed in each 100 yards of road, and the labour attending the same; and as they all knew the price of the gravel, the amount was easily ascertained: every item, such as lowering small eminencies, making brick drains, ditches, expence of tools, the wear and tear thereof, with the charge for a proper foreman, were distinctly stated, and the prices to each fixed against them.

They expressed their astonishment at the difference between my estimate and the one before given in by Mr. Collins, and they were afraid that they must give up the pursuit, if it could not be done for less. Mr. Thornton returned me the thanks of the committee for my trouble, attention, and handsome offer; and I was about to retire, when I made them a further tender to execute such parts of the road as stood most in need of alteration, &c. agreeable to my plan, and by laying before them a monthly statement of the expenditure, and of work done, as well as what remained to be done, they would be led into no error, and they might then stop whenever their finances were nearly consumed; whatever, therefore, was done, would not be required to be done over again, and it would be completing so much of the work. I again said that to execute the work in this way I would superintend it for twelve months, or more, without putting them to one halfpenny expence on my account; and to convince them further I had no sinister views in what I offered, I was desirous that no money, in any shape whatever, should pass through my hands. After I had retired, Mr. Wildgoose entered, but with no plans or written estimate; he told them that it could be done in the most perfect manner for one thousand pounds; he was told what I had said, but he still persisted in the correctness of his own estimate, and he was accordingly employed to superintend the work, for which he was to be paid £50.

It was evident to some of the committee that this was a job cut out for Mr. Wildgoose: they did not hesitate to say so, and the event proved that they were right. It was clear also from the manner in which he set about the work, that he either thought he had under-rated the job in his estimate, or else that he knew nothing of what he was about; for instead of taking levels, setting out his work in a workmanlike manner, by staking out his footpaths of a proper wi [illegible] form the road, or rather the centre [illegible] n as straight a line as possible, and v [illegible] not be carried straight, to make the c [illegible] as possible, he began, after having g [illegible] antity of gravel ready, by laying on t [illegible] the middle of the old road for a cert [illegible] nd of equal thickness, whether there [illegible] hole, and then afterwards bringing the footpaths up to the road, and then in order to give a degree of convexity to the new laid gravel, the sides of the road, which, upon the average, I proposed to raise at least nine inches, according to the lowest estimate, he pared down nearly as much,* in order that by so doing he might also make up his footpath, by which ignorant step he got in many places below the common water mark, and he exposed the natural surface and bed of the road, so that during the whole of the following winter they never could keep the wheel-ruts filled in, and the quantity of gravel that was thus thrown away was beyond all conception; these repairs were not in the contract.

I have said that it was clear he thought he had under-rated the job, and it was so: because, without taking a level in any one part of the whole length of road, he began at four different parts of it at nearly one and the same time; and, by carrying on these together, he imperceptibly drew the trustees into a situation they were not aware of, for after they had exceeded the £1000, they found they had got but little more than half way, and these four parts that were carrying on together, were then in such a situation that they were obliged to go on. He, the surveyor, well knew that, if he had begun only at one end, and had carried his work regularly forward, as soon as the amount of the estimate was expended, the committee could finish it off, and make a pause until they were furnished with fresh powers, and more money; and if dissatisfied with his judgment, might employ some other person to finish it. However he went on, and made a finish after in appearance as was completely the case, for they were obliged to take up most of the drains which he had laid, and lay them lower, owing to his not having taken levels.

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* This, I observe, is every where his method of convexing a road, by paring the sides down to the quick.

When the bills came to be collected, it turned out that they amounted to very near £1800, and when a proposal was made to farm the road for 7 years, and he was a candidate for it, some of the trustees remarking upon the largeness of the sum which he expected, he replied the road was still defective, and would cost him 5 or £600 the first year to make it complete: if therefore we add these two sums together, they will make at least between 23 and £2400, and if to this we add 2 or 300 more for his want of knowledge in the matter, it will appear that I was not much out in my estimate; and when we consider that all the gravel which they used, with the exception of a few loads of flints, was dug off the waste for which they had only to pay for digging, and that I should have purchased all or n [illegible] was contained in the estimate, becau [illegible] t to be infinitely superior to the oth [illegible] it is considered that they contracte [illegible] carting of their gravel, &c. to be done [illegible] d less than I was warranted in setti [illegible] an estimate, supposing me to be held [illegible] ntract, and considering how superfici [illegible] y shamefully, the work is done, my estimate will appear to have been the cheapest, and the most consistent.

Will any man who reads this plain statement, which I pledge myself to be as near the truth as possible, say the conduct of the trustees or rather the committee of them, was free from bias, and such as it ought to have been. I have the highest respect for some of them, and I well know what were their sentiments, for I believe they hardly ever attended the future meetings, and therefore, it shewed that those sentiments were not offered for the occasion. It is sufficient for my purpose that they justify the remarks made in the preceding part of this chapter, that nothing short of striking at the root of all the old system, will ever make the roads what the public have a right to expect them to be.

In following this line of road down Balam hill, we find it in the summer deep in dust, and in the winter as deep in mud, and so it continues almost the whole of the way to Mitcham, insomuch that the Brighton coaches, and many of the Carshalton, Mitcham, and Sutton teams prefer going up Mitcham-lane to Streatham, and thence along the Wash Way to London, though round about, to the unpleasantness of wading through the dirt or sand of Tooting, Balam, &c. In the first place, no regard is paid to water courses, nor to the level of the road, but it is in hills and holes, in clay or in sand all the way. Mitcham itself is always in a sad state, and never will be otherways while those high trees are suffered to stand, which exclude both sun and air; the road is also too narrow and too low; at the entrance, and through the town of Sutton, the road is very bad, nor is it so good as it should be over Walton heath.

On the Croydon road, after you pass Merton bridge at the hither end of the Wash Way, until you arrive at the bridge at the extreme end of Streatham, the controul of the road is under the direction of two treasurers, but the executive part is under the management of Mr. Edward Farnborough, as the surveyor; and as far as his powers go, and their allowance will permit him, the road is in good order, although labouring for one half the distance under the mortification of a scarcity of gravel, and that little not good. Whatever he undertakes, he goes about it systematically, and knowing it practically, he does it judiciously. I pay him no undeserved compliment when I say, that in the whole line of road within the jurisdiction of the Surrey trust, there is no man knows more, few men do so much, and scarcely any men pretend to so little.

Beyond Streatham bridge to Croydon turnpike the executive part is managed by Mr. Wildgoose: a very short dis [illegible] upon this division is sufficient to co [illegible] a blind man, or one whose sight is [illegible] the direction and management is ch [illegible] er of them try the experiment on t [illegible] East Bourne coach, or any other of [illegible] ned coaches, and he will soon be co [illegible] it is so, I do not confine myself to [illegible] y only, but I take the last three years. [illegible] oles, water standing in the middle and on the sides, convex, concave, dead levels, inclined planes, and all the figures that Euclid can offer are almost to be met with in a few yards. Before you enter the town of Croydon, the road is extremely convex, the sides being cut down very quick, it then spreads out until it is nearly level, it becomes then quite so, it afterwards passes into the concave, and very much so, it changes suddenly to the level, to the convex, to the inclined plane, and finishes in a convex; I have heard the coachman curse the road, on this side of Mr. Farley's, before you enter the common; I have heard Shorey's and Newton's waggoners curse the road, and many a wearied horse has nearly foundered there: can all this be right, with almost the best materials that can be used, a superabundance of them, (for it was out of this district that the materials were drawn for new making the Kent road, and such as were used, besides gravel, out of this neighbourhood, for the Clapham road) and a foundation such as every man would wish to have for the bed of a road; I think not, nay I am sure not; I therefore do not hesitate to say, that there is neither theory nor practice to be found in this division.

Beyond this, and round the hill of Riddlesdown, a new road has been formed, or rather the ancient road has been revived, with some little alteration, but it is far from being so complete as it ought; there are declivities where there ought to be none, and the sides of the road are in many places too rounding, in some very dangerous, and in others there is no guard or fence to preclude the possibility of danger. Beyond the Rose and Crown the road is flat, of unequal width, with no water courses; and after passing the Half Moon it is a dead pull, with nothing to relieve the draught until you get to Godstone hill, where the declivity is bad, oftentimes dangerous, especially after storms, and the road becomes another dead pull as far as Godstone.

From this account it appears, that although there are the best materials almost that can be desired on each side of the road, during the whole of this distance, there is nothing like system in the conduct of it; no water courses, few or no drains, scarcely any of the inequalities corrected, nor the road confined to its proper width, which, by so doing, would allow of a path for foot passengers; of course there is no proper center, and therefore the road may be said to be neither convex nor level, but just as it happens.

From Godstone to Fellbridge Water, the road is hard and sound, uniformly convex, many of the eminences reduced and laid into the hollow way, which brings the whole surface more upon a level;
the whole is l
d I may say dry and
free from ruts
r, and firm and free
from dust in th
hoever was the maker
of this road, h
great judgment; and
my friend Mr.
has been long enough
the treasurer
for me to say that no
road of equal
ffic in this kingdom is
kept so unifor
at such a comparatively small expence. I have but one observation to make further upon this division, which is, that when Tilburster hill was being lowered, it was only a pity that the soil that was taken off the top had not been carried into the bottom by the brick-kiln, so that by filling that up, or at least raising it as high as could have consistently been done, without injuring the property in front of the White House; or if the trustees had bought the house rather than it should have been an obstacle to so great an improvement, and, after selling the materials, and finishing the hill there about, the hollow way might have been entirely filled up, and the length and steepness of that formidable hill would have thus been greatly lessened, and the estate would, upon a resale, have fetched its original cost. I hope to live to see my friend undertake to reduce the top of the hill another ten or fifteen feet, which

will afford him an opportunity of attending to this point.

There is a branch of the turnpike road which leads from Smitham Bottom through Titsey, into Kent, which is kept in very sorry order, owing, I suppose, to the smallness of the fund. That which leads from Godstone to Westerham is always sound and good, and is kept at a very small expence, owing very much to the free admission of the sun and air, by keeping the hedges very low.

From Reigate to the Sussex oak the road is every here and there extremely defective, both as to its proper width, its drainage, and the attention to its holes being timely filled up. At the turnpike there is a branch which leads through Red Hill Common down Bonehurst-lane to Horley Common, a part of this road is finished, and a part remains to be done. I cannot say that I have any opinion of this mode of road making; because in the instance now before us, after travelling a certain distance upon a hard good road, to be suddenly immersed in the mud, and in many places very deep during the winter six months, is a circumstance by no means pleasing, and then on a sudden to get out of the mire upon the hard road, the transition appears so extraordinary as to fill the mind of a stranger with no favourable ideas of what he is to expect. But in this road there are times in which it is dangerous to pass, and I do not hesitate to say that the trustees are extremely remiss in not finishing it in some shape or other; and it is only surprising, and I often wondered that the proprietors of estates on the sides of it, have not for the last two years indicted it. I have known better roads that would not have escaped. It is particularly bad beyond Salford bridge to Bonehurst farm, and I do not know that the trustees can justify taking toll so long as they have not, or do not, finish the road, because it is upon a presumption, in the act of Parliam owered the trustees, that they should d and sufficient road from the turnpik igate road to Horley Common. Ma ers have applied to me about it, and likely to travel that road in future a ave during the last two years, I wo te standing forward their champion, ; the road. If their surveyor made blunders, and ignorantly or knowingly under-estimated the expence of making the road, that is not a sufficient reason why the public are to pay for travelling on a turnpike road, which has never been made, and is suffered to remain a monument of their incapacity and inattention.

From Tooting to Epsom through Merton, there is nothing to boast of in point of management, the road is often very bad from the late Mr. Walter Powel's, in front of Alderman Skinner's, through the village of Merton, and as far as Mr. Polhill's grounds extend. As you ascend the hill, and to Ewel Gate, the road improves, but more owing to the openness of the situation than to good conduct, for the nearer you approach the town of Ewel, quite through it, and through Epsom to Leatherhead, very little attention appears to be paid to it, for it abounds in inequalities, in ruts, and holes standing with water. In the villages and towns before-mentioned, the road through them is oftentimes either level or concave, very seldom convex, so that they are generally very dirty in the winter.

The road from Leatherhead to Dorking is far from being what it ought to be, considering the profusion of materials so near at hand, and it might be made better from Dorking to Horsham.

From Leatherhead to Clandon we have a fine open, hard, well constructed road, not too convex to endanger the overturning of carriages, nor so flat as to hold the water; if there is any objection to this road, it is probably somewhat too wide in particular parts of it, for the comparatively little traffic upon it. It is, next to the road from Godstone to Grinstead, the best road in the county at all seasons of the year, nor do I think it would be much worse than it is now, if there was twenty times the traffic upon it, especially under the management of the present surveyor. But beyond Clandon to Guildford, the road falls off in goodness: it is in the first place narrow; and secondly, it is obscured and injured by the rows of trees which are on each side of the road, preventing the sun and air, during the summer six months, from drying up the moisture which it acquires during the other six months, from the decay of the foliage, and the continued drip from the trees.

From Kingston to Guildford we have a road so uniformly inferior to the other, as to make more than the difference of a pair of horses in the draught. From Kingston to Ditton is often infamous, indeed I may say all the winter, and there is no possible excuse for it, as the tolls that are taken must be equal to the repairs of it; allowing that they cannot obtain hard gravel for this road handy, they have the advantage of water carriage, and there are plenty of hard flints which might be brought by that conveyance; but the road itself is in no form or shape, it is more flat or concave than any thing else. Through Esher and Cobham it is equally defect there ought to be lowered to n ore level. Through Ripley the ro gets more rounding towards Send tu is nevertheless generally very dirty itches are not deep enough to carry sufficiently fast. Beyond the gate, a Stoke Park pale, the road is not of o dth, nor of a regular shape; it is in p t, and in no part sufficiently convex. In some instances it is 24 feet, in others 30 feet, and again in others it is 60 feet and upwards wide, without any reason whatever.

From Guildford to Godalming the road may be called uniformly bad; it is either too flat, or where there is a convexity, there appears to be no regard to conveying off the water. From Godalming to Milford for 1½ mile, the road was scandalous and dangerous in a very high degree, and at the time I am speaking of, the spring of 1803, it was with great difficulty that any sort of carriage could get along without overturning; it is true they were attempting to new make the road, but being ignorant of the principles of road making, they were laying the foundation with the soil which they were taking from the banks where they were widening the roads, and which, of all the materials

I ever saw for the purpose, are the worst; neither did they seem to be preparing any drains for carrying off the water. I do not know what state it may be in now, but if ever that makes a good road, without a very heavy expence, or an alteration in the system, I shall be mistaken; it was laid so high and round, and when it came to be well coated with gravel, it would make it still higher, and, as the foundation was a nasty clay that would hold water like a dish, it would be extremely dangerous to get off the balance by going a little on one side the road, and whenever the road cuts in, the ruts that would soon be formed, would increase the danger. They began the job too late in the season, and the consequence was, that it was almost impassable the whole of that winter. Upon the whole it was among the worst jobs I ever saw done. The road continues through Mousel to the Seven Thorns beyond Hindhead, where it leaves the county, and, during this distance of about eight miles, it is kept in a very imperfect state.

Better cannot be said of that branch from Milford that leads to Haselmere, or the other branch that goes through Chiddingfold: a total neglect of drains and water courses, and an uniform want of attention to the filling up ruts, and preserving the crown of the road, seems peculiar to this part of the county.

Returning back to Guildford there is a road leading through Shalford, Bramley, and by Hall-place to Awfold, which is the extent of the county, and where formerly there was an extensive glass manufactory established by some French refugees, who fled hither to avoid the general massacre that prevailed in France at that time. This road is in many places very bad, particularly about Stonebridge, where the manor of Baybrie joins the road; the passage over the bridge is worn quite concave, and what I should call quite to the quick, and will in time endanger the bridge itself; for there is a great traffic on that road in corn, chalk, lime, coals and timber. The condition of the road certai end the nearer we approach Awfold, arts of it are very bad indeed.

From Guild am we pass over the new road along e of the hill, and over the Hog's-back, Farnham; the situation of this r and the materials of which it is forn also, as ought to make it the very best in the county; but it is very far otherwise, for instead of their being any outlets to convey the water from the road, the scrapings have been accumulating so long as to make a high boundary on each side; as a great part of the road is worn either hollow or flat, and as none of the ruts are ever pecked in, this road may be said to be in very bad condition, and would shew itself to be so, if, instead of its being upon the brow of a very high hill, it had been in the bottom; and if, instead of hard flints, they had a soft sand-stone, and the understratum an impervious clay. It has, besides, an assistant of no small consequence to the road, which is, what is called the summer road for all light carriages, horses, &c. this is perhaps more used than the main road. I am sure that a very small expence would keep this road, in all seasons, in very high order.

From Farnham we cross over to Staines through Frimley, Bagshot, and Egham, but as we pass through a part of Hampshire through Blackwater, we are not in the county of Surrey until we arrive at Frimley: as this road goes over the heath where materials are scarce, and the foundation tender, it is almost impossible to expect a good road, yet upon the whole it is a far preferable one at all seasons to many of those I have before described; it owes, no doubt, a great deal to the openness and airiness of the situation, and not a little, perhaps, to its being so near the King's hunt, where, if the roads were bad, notice might be immediately taken of it; perhaps, however, I have ascribed a reason that may not attach.

In returning from Kingsten to London, we pass over Wimbledon Common, and between the xith mile stone and the Robin Hood, the road is extravagantly and unnecessarily wide, and the hill is a very great nuisance, it might be lowered at no vast expence, and it would be a great ease to travellers. The road continues unnecessarily wide over Putney Heath to Wandsworth, where, from the viith mile stone to that town, it is generally bad. The road again is unnecessarily wide from about the vth to between the iiid and the ivth mile stone. It is a very heavy road, either summer or winter, from Vauxhall turnpike to Wandsworth. The additional, or rather superfluous width of nearly the whole length of this road, causes a vast consumption of money in gravel and labour, which if brought within due bounds, would be better kept at a less expence; but as the treasurer has no interest in reducing this, in order to save money, much less has his surveyor, so it is not likely, that without fresh grants, we can expect Kingston Hill or Battersea Rise to be lowered, however desirable it might be to the public that they should be.

We are now about to enter the bills of mortality, where, in a very short compass, we shall find no less than three tre ng a district, with three surveyors to b ing that which is not employment f e head treasurer, Mr. Samuel Thorn plasterer for surveyor, takes the road e's-end in the Borough to Kenningt with some collateral branches. Sir et takes the Westminster and Blacl to Kennington turnpike, with a man who lives almost, if not always, at Highgate, for his surveyor, (I object not to the man, for he has judgment, but to the distance from the scene of action) while Mr. Lett continues his line from Kingston to Newington, and with a waiter at Vauxhall gardens for his surveyor. There is another surveyor under Mr. Crespigny, who takes the Walworth division as far as the road that enters the Kent road at New Cross. The money squandered away in these divisions annually exceeds all credibility.

In Lancashire and Cheshire the roads are paved in many parts with granite and other hard round pebbles, some of which are found in their marl pits, or fetched from the Welsh coast; the pavement costs a thousand or twelve hundred pounds a mile in making. See Dr. Watson, IV, page 349. Allowing these roads to cost in the first instance £1500 a mile, I am not clear whether it would not be cheaper than as we go on now, for the annual expence is immense; they would require but little reparation: and one surveyor, and one treasurer, would be sufficient for the whole.

I never yet heard a single individual praise either of these roads: they have been long the theme of abuse in the daily prints, as well as in the stage coaches, and how should it be otherwise; for, instead of having men of the very first abilities to manage them, and who would be competent to provide against the extraordinary wear and tear of one of the first outlets from the metropolis, we see that it is committed to the charge of those, who from their habits in life, must be ignorant of every part of the business. It is not so much the fault of the men as it is of the trustees who made choice of them.

There are, as near as may be, upon a rough sketch, 250 miles of turnpike roads in this county, and I have no doubt at all that the gross expence attending these roads is upwards of £20,000; we are every year getting deeper and deeper in debt, and if that is any proof of a nation's riches, the county of Surrey must be rich indeed; for I dare say, that the debt for which all the tolls are mortgaged, does not amount to a less sum than its annual expenditure. I hope I am mistaken, but if my information is correct, and I would not wontonly make such an assertion, does it, or does it not behove government, and the landed proprietors, to look into it? for eventually the whole weight of this debt must, if not paid off, center on land.

Having thus taken a circumspective view of the turnpike roads, and in a very summary way run over the parochial ones, I beg leave to say, that in order to be as correctly furnished with the several items I had occasion for, to enable me to come at many of the facts I have stated, as well as to obtain the general sentiments of the gentlemen and farmers in it, erty of submitting the following qu :

First, Wh of the roads in your neighbourho parochial?

Secondly, e may be assigned their uniform bad the system, in the materials, or in kill in the managers?

Answer.— in some of the districts state the public roads to be good enough, and the parish ones to be lamentably bad, while some accounts from the same quarter, state them all to be bad. Almost all the accounts from gentlemen say that the roads might be made better, if they were properly managed. But the answers from some of the smaller farmers being curious, and the doctrine new, at least to me, I beg leave to record them, because, never was there a sentiment more general among them, and as it were by instinct; and shews in strong colours their aversion to improvement, and their habitual propensity to continue in the same unenlightened state in which they were bred.

They say, that the roads were all of them good enough for them; that good roads were of no advantage to them, for, although they were obliged to put five or even six horses to their waggon, to take their corn to market, which probably four would be able to do quite as well, yet as those two extra horses would be idle at home, their plough-team being broken by taking away four, as on the best roads they could not do with less, the other two might as well be employed in helping the four through the dirt, as staying at home doing nothing; that they did not keep one horse more because of the badness of those roads; and if they were ever so good, their men never would do any other work of signification after they were returned from market; therefore, they were not likely to get much by good roads that way, and keeping roads in repair subjects them to heavy tolls, as well as to troublesome statute duty.

I leave the reader to animadvert upon this doctrine as he pleases.

To the second query, the answer was uniform, that it is in the want of system and skill in the persons employed to keep the roads in repair, rather than in any deficiency of quantity or quality of materials; that the roads are almost invariably suffered to become dangerous before a rut is picked in, or a hole filled up, by which it often requires a load of gravel to do that which, if timely applied, a bushel or two might have been sufficient; that the persons usually employed upon the roads, are old and infirm men, past their labour, and thereby a great charge for labour arises, which might be better done for half the money; that a great waste of gravel takes place by laying it on at improper seasons, when, from the quantity of moisture which it imbibes, it turns to mud when reduced, instead of binding and making a solid bed. And lastly, that nothing short of a total change in the system, will ever make the roads what the public have a right to expect, always sound and good.

The great defect in the parochial system is the continual annual change of surveyors, by which it
often happens be otherwise,) that one
ignorant man a skilful one, undoes
what his pred done; or if he does not
undo it, by e ple to alter and take it
to pieces, he follow up the plan, and
thereby suffer royed for want of timely
assistance.

It would l that has passed, that a fundamental change must take place before any substantial and permanent good can be expected. But, although the trustees may have no objection to it, and perhaps may see the necessity of lending their assistance towards effecting it, yet we cannot expect the same liberality from the treasurers, who, if they are bankers, or in any other business, may find it very convenient to possess large sums of the public property, and that they do, may be deduced from these two circumstances; that at the death of Sir Joseph Mawbey, who had been many years the head treasurer, there was as much canvassing on the part of Mr. Thornton and his friends to succeed him, as if it were for a seat in parliament, and the same was done at the death of Mr. Stonard. These facts speak for themselves.

It was at one time thought to be a good plan to let the turnpike roads to contractors, who were to keep them in repair for a certain sum of money per annum; but my father, who was one of the trustees, opposed the measure in every instance, and the sequel proved that his opposition was not taken up on slight grounds, for he predicted the consequences that would follow, and they did follow; for the contractors were mostly desperate characters, who had no knowledge of the business, and who, after ruining the road, because they had taken the contract at a great deal too low a price, were obliged to give it up. He always said that it was no easy matter to compel men, under a losing contract, to fulfil the conditions of it, notwithstanding security may have been given, where good principles are wanting.

Before this unfortunate contract took place, it was proposed to erect weighing engines at the three gates nearest London, but after much consideration the idea was abandoned. The proposal has been again resumed, and again given up, and I think very properly so. I am no enthusiast for raising a sum of money, which was the intention, by a system so slow and insensible. If these weighing engines are to repair the roads, will they bring in one hundred pounds or produce 100 loads of gravel? Will they not take from the support of the road by diverting the traffic another way? Is it not owing to the badness of the roads, to the want of system, and to that fickleness and instability of conduct on the part of the trustees, that the Croydon canal and iron railway have been undertaken? Was it not one of these reasons that induced Mr. Shepley, and the other great manufacturers along the river Wandle, to prosecute the canal and the railway to the very great loss of revenue to the trust? I have reason to think it was, not because I have often heard them say as much, but because they had no other way of counteracting the increasing expence of wear and tear, and the injury done to the badness of the roads, but by s sures. The weighing scheme must tl ndoned for ever, since the trustees ha om their roads that traffic which it would have supported these machines

We have in i tolls bring in a large revenue, but w of also, or at least in assertion, for I believe that it was not proved, that this revenue was quite inadequate to the support of the road, for the preamble to the late act, passed in the 42d Geo. III, recites, "Whereas the trustees appointed in or by virtue of the said recited act, meaning the act of the 25th Geo. III, have proceeded in the execution thereof, and several considerable sums of money have been borrowed, and are now due and owing upon the credit of the said roads; which money cannot be repaid, (nor ever will under the present system,) and the said roads properly amended and kept in good repair, unless the term of the said act be continued; and the powers and provisions of the said act being found in many respects defective, it is expedient that the same should be repealed, and further and other powers granted instead thereof."

By this act, the trustees have increased the tolls at least £50 per cent in the aggregate; but, whether they have improved the goodness of the roads one per cent, since it passed, is a question which few people will hesitate to pronounce in the negative.

In page 17, among the exemptions from tolls, all carriages laden with dung, mould, soil, or compost of any nature or kind whatever, for manuring any lands or grounds within any of the parishes described in the bill, are exempted from toll.

This I think is wrong, with submission; the weight of these articles, is perhaps nearly equal, bulk for bulk, with any other goods, and, with the same number of horses, they do as much injury to the road; why are we to be so partial to the soil that produces the necessaries of life, and refuse it to the manufacture which produces the conveniences which now-a-days are perhaps of as much consideration as the necessaries of life. Besides, is not this exemption subject to many evasions? Is it not possible to put three or four hampers of claret, a piece of brandy, a pipe of wine, or a puncheon of rum at the bottom of a waggon, and cover it, or them, effectually with dung? Are we sure that all the dung that goes in a noble lord's waggon, or that of the esquire, is going to the farm, and not to the melon bed or kitchen garden? Are we not under these circumstances likely to sustain a loss when we mean to confer a benefit? I think we are, and therefore it appears to me that these exemptions are founded in error.

There is a mistake in the wording of that clause in page 31, which I apprehend was overlooked, wherein the surveyor has a power to enter the premises of any person to top, lop, and cut down any trees, shrubs, or bushes growing in the hedges or banks adjoining thereto, or within 15 feet of the extreme sides of the road, in case the owners thereof shall neglect so to do within ten days after notice has been given. By which clause, if a gentleman has a n [illegible] e oak, or other trees, standing withi [illegible] of the act of Parliament, the surv [illegible] r them to be cut down in the summer [illegible] if he does not do it, the surveyor n [illegible] do the needful, taking as many men [illegible] ssist him as he thinks necessary; and [illegible] f these trees must pay for the cutting [illegible] whether he likes it or not; so if these trees by being cut down at an improper season, have lost one-half or two-thirds of their value, no recompence whatever is offered to the owner of them for such loss, although his property must be greatly reduced thereby. If our laws are founded in equity, there surely must be some egregious over-sight in this clause. But I may be told that the trustees are too honourable men to suppose them capable of suffering any surveyor to commit so flagrant an act; to which I answer, that nothing should be contained in an act of Parliament that would give a colour of suspicion that such things may be done under its sanction with impunity.

In page 36, there is a clause which states, that if any person shall get or take away any materials, out of any pit or quarry which shall have been made for the purpose of getting materials for the said roads, before the surveyor or surveyors of the road, for the making, amending, or repairing of which, such materials shall have been dug or gathered, or their workmen, shall have discontinued working therein for the space of ten days, (except the owner or occupier of any private ground, and persons authorized by such owner or occupier to get materials therein for his own private use only, *and not for sale,*) and for such offence, if he does presume to sell any, he is to forfeit and pay a sum not exceeding 40*s.*

Surely, the legislature never meant to infer, much less to inflict a penalty, that a man was not to dig and sell, and carry away gravel or other materials from any part of his own premises, whether a pit had been opened by the trustees or not; he would not be justified in selling that which was already dug by the trustees, but it would be a most curious thing indeed, to tell the owner of that estate that he must not sell or dig gravel where he pleases, because perhaps the trustees have broke into his ground without his consent. What would the noble Lord Thurlow say to such a measure? I think he would be likely enough to shut them out of his premises altogether, as he did on Brixton Causeway hill some few years since.

An Account of the Expenditure of the several Lines of Road under the Care and Management of the Surrey and Sussex Trust, for the last Seven Years, commencing February 1795, and ending February 1802.

STONE'S [illegible] NINGTON.

Mr. [illegible] *s Road.*

Length of Road.—F [illegible] to Merton and Hazard bridges, 1 m. 5 fur. [illegible]

	£	s.	d.	Average of 7 years.
From Feb. 1795 to [illegible]	[illegible]	18	4	£1038 11 7
Do. 1796 to [illegible]	[illegible]	11	3	
Do. 1797 to [illegible]	[illegible]	8	1	
Do. 1798 to [illegible]	[illegible]	8	2	
Do. 1799 to do. 1800,	1017	8	2	
Do. 1800 to do. 1801,	2127	9	0	
Do. 1801 to do. 1802,	1549	18	1	
	£7270	1	1	

CROYDON DIVISION.

Mr. Wilkinson's, late Mr. Wm. Malcolm's Road.

Length of Road—From Hazard's bridge to the north end of Streatham parish, on Brixton Causeway hill, 2 m. 3 fur. 29 pol.

	£	s.	d.	
From Feb. 1795 to Feb. 1796,	£183	2	10	£306 17 8
Do. 1796 to do. 1797,	425	10	11	
Do. 1797 to do. 1798,	346	2	2	
Do. 1798 to do. 1799,	352	15	10	
Do. 1799 to do. 1800,	361	9	3	
Do. 1800 to do. 1801,	251	8	0	
Do. 1801 to do. 1802,	227	14	7	
	£2148	3	7	

Rev. Dr. Bullock's Road.

Length of Road.—From Brixton Causeway hill to Hermitage bridge, 2 m. 2 fur. 23 pol.

				Average of 7 years.
From Feb. 1795 to Feb. 1796,	£183	2	10	£321 3 4
Do. 1796 to do. 1797,	525	11	9	
Do. 1797 to do. 1798,	346	2	2	
Do. 1798 to do. 1799,	352	15	0	
Do. 1799 to do. 1800,	361	9	3	
Do. 1800 to do. 1801,	251	8	0	
Do. 1801 to do. 1802,	227	14	7	
	£2248	3	7	

Mr. Chatfield's Road.

Length of Road.—From Hermitage bridge to Croydon turnpike, 2 m. 4 fur. 28 pol.

From Feb. 1795 to Feb. 1796,	£256	7	9	£409 13 0
Do. 1796 to do. 1797,	455	16	4	
Do. 1797 to do. 1798,	485	0	1	
Do. 1798 to do. 1799,	493	16	2	
Do. 1799 to do. 1800,	506	1	0	
Do. 1800 to do. 1801,	351	18	11	
Do. 1801 to do. 1802,	318	16	3	
	£2867	16	6	

Total average per annum for the whole Croydon division £1037 14*s.* 8*d.*

EAST GRINSTEAD DIVISION.

Sir William Clayton's Road.

Length of Road.—From Croydon turnpike to the White Hart at Godstone, 9 m. 1 fur. 19 pol.

From Feb. 1795 to Feb. 1796,	£498	5	4	£545 15 3
Do. 1796 to do. 1797,	563	4	6	
Do. 1797 to do. 1798,	560	10	8	
Do. 1798 to do. 1799,	546	12	3	
Do. 1799 to do. 1800,	624	17	9	
Do. 1800 to do. 1801,	491	12	6	
Do. 1801 to do. 1802,	535	3	8	
	£3820	6	8	

Mr. Lucas's Road.

Length of road.—From the White Heart at Godstone, to Witch-cross, in Ashdown forest, 14 m. 3 fur. 26 pol.

	£	s.	d.	Average of 7 years.
From Feb. 1795 to Feb. 1796,	£747	7	7	£881 9 8
Do. 1796 to do. 1797,	744	15	2	
Do. 1797 to do. 1798,	980	15	9	
Do. 1798 to do. 1799,	959	18	6	
Do. 1799 to do. 1800,	1077	6	7	
Do. 1800 t	857	8	7	
Do. 1801	802	15	5	
	6170	7	7	

Total average, per n years for the whole East Grinstead division, £

SION.

ad.

Length of road.—Fr nd Harrow, at Newington, to Kingston, 9 m. 7 f

	£	s.	d.	
From Feb. 1795 to Feb. 1796,	£2622	13	4	£931 4 9
Do. 1796 to do. 1797,	706	19	7	
Do. 1797 to do. 1798,	1131	14	9	
Do. 1798 to do. 1799,	1199	6	2	
Do. 1799 to do. 1800,	1228	19	4	
Do. 1800 to do. 1801,	854	14	10	
Do. 1801 to do. 1802,	774	5	3	
	£6518	13	3	

SUTTON DIVISION.

Late Mr. Baldwin's, now Mr. Prescott's.

Length of road.—From Merton Bridge, to the south end of Clapham common, 2 m. 3 fur. 24 pol.

	£	s.	d.	
From Feb. 1795 to Feb. 1796,	£233	10	4	£735 18 0
Do. 1796 to do. 1797,	415	2	8	
Do. 1797 to do. 1798,	441	5	6	
Do. 1798 to do. 1799,	649	14	10	
Do. 1799 to do. 1800,	460	17	2	
Do. 1800 to do. 1801,	320	10	8	
Do. 1801 to do. 1802,	290	7	3	
Expended extra within the last 2 years,	2339	18	0	
	£5151	6	5	

Mr. Bush's road.

Length of road.—From the south end of Clapham common, to the town of Sutton, 6 m. 6 fur. 9 pol.

				Average of 7 years.
From Feb. 1795 to Feb. 1796,	£389	3	0	£621 15 0
Do. 1796 to do. 1797,	691	17	2	
Do. 1797 to do. 1798,	735	9	3	
Do. 1798 to do. 1791,	749	11	5	
Do. 1799 to do. 1800,	768	2	3	
Do. 1800 to do. 1801,	534	4	2	
Do. 1801 to do. 1802,	483	18	2	
	£4352	5	5	

Total average, per annum, for 7 years,
for the whole Sutton division. £1357 13 0

CAMBERWELL AND PECKHAM ROADS.

Mr. Crespigny.

Length of road.—From the Elephant and Castle, at Newington, to the Fox under the hill, at Camberwell, and from Camberwell green, to the east end of Peckham lane, 4 m. 0 fur. 15 pol.

From Feb. 1795 to Feb. 1796,	£350	0	0	£700 0 0
Do. 1796 to do. 1797,	700	0	0	
Do. 1797 to do. 1798,	900	0	0	
Do. 1798 to do. 1799,	700	0	0	
Do. 1799 to do. 1800,	850	0	0	
Do. 1800 to do. 1801,	700	0	0	
Do. 1801 to do. 1802,	700	0	0	
	£4900	0	0	

STOCKWELL ROAD.

Mr. Tyler.

Length of road.—From Vauxhall bridge through Stockwell, to Brixton causeway, 1 m. 4 fur. 30 pol.

From Feb. 1795 to Feb. 1796,	£60	0	0	£84 5 9
Do. 1796 to do. 1797,	80	0	0	
Do. 1797 to do. 1798,	80	0	0	
Do. 1798 to do. 1799,	130	0	0	
Do. 1799 to do. 1800,	80	0	0	
Do. 1800 to do. 1801,	80	0	0	
Do. 1801 to do. 1802,	80	0	0	
	£590	0	0	

Total length of road 58 m. 4 fur. 7 pol.; the total average expence of which is £6576 14*s*. 0*d*. or about £112 per mile.

As the above statement is published by authority of the trustees, it is to be presumed correct, it will shew that in Mr. Thornton's and Mr. Prescott's divisions, being only a distance of four miles and 26 poles, no less a sum than £1774. 9*s*. 7*d*. has been annually expended for the last seven years, which is nearly £444. per mile, a sum exceeding, I will take upon me to say, by one third at least, what it
ought to do, eyors were appointed,
and they did th Even at this time there
are parts of the d shamefully low, and
as shamefully l rove it, on the 29th of
April 1805, af showers of rain which
fell on that day the south east side of
the road, whi the common sewer to
receive the w road, was covered a
distance of six or seven feet with water, and remained some days on the road. Nothing can prove the fallacy and want of judgment in making that road more than this, because, instead of being lowered on the sides to make the road convex, the middle of the road ought to have been made so high, and the sides also, as to prevent the water, at its greatest height, from being on a level with the sides of the road, in which case no water would ever lodge on the road to do it the least possible injury.

COMMON FIELDS, COMMONS, HEATHS.

These are subjects that cannot be too often treated upon while there is one acre of either left in this kingdom; they have individually employed the pens, and occupied the attention of some of the most enlightened men which this country could boast. Every man who has had the honour to be employed, or to be in any wise consulted, by the Board of Agriculture, either directly or indirectly, has held out this uniform language, "that this country, under any improved system of husbandry whatever, can neither grow corn, nor stock enough for the consumption of its present population, unless more land is converted into tillage, and more laid down to pasture."

Indeed the strongest proof that can possibly be brought forward in support of this assertion, is the state of this country in the year 1800, when the poor were almost starving, and every class of his Majesty's subjects were making use of every substitute, to supply the deficiency of bread corn; and notwithstanding the greatest importations of grain from the four quarters of the globe that were ever known, amounting to no less than 2,917,823 quarters, 4 bushels of wheat. 1,460,576 cwt. of flour. 252,960 quarters of rye. 259,115 quarters of barley. 1,641,867 quarters of oats. 81,633 quarters of peas. 37,791 quarters of beans, during that and the two succeeding years, assisted as they were by very abundant crops of all kinds of grain, yet this country was only emerging from its perilous state, when the crop of 1803 placed us in a state of temporary independence; unfortunately, however, the crop of 1804 has been such as must convince every unprejudiced mind, that even assisted by the surplus of the preceding years, together with a large importation, it is not possible to keep the price of bread corn within any moderate bounds; and hence we may be satisfied of the absolute and positive necessity for a very extended cultivation.

We have an administration formed, and what is better, disposed to do every thing within their power to make this country prosperous. We have in the two houses of parliament the most enlightened statesmen that this kingdom ever beheld, and who, to their honour be it said, have taken the plough by the handle; let us hope, therefore, that their united efforts will get the better of every difficulty that has hitherto prevented the passing a general inclosure [illegible] ude to the inclosing of the several co [illegible] commons, heaths, and wastes throug [illegible] gdom; and in order to prove of how [illegible] ial consequence it is, I herewith pre [illegible] is county as a specimen; and I am conv [illegible] accomplishment of this measure, and th [illegible] it will have throughout the country, [illegible] re lasting benefit, and confer greater credit upon it than the most brilliant victory that ever was effected by its arms.

State of the Common Fields.

	Acres	Present Rental	Total value	Rent when inclosed	Improved value
		s. d.	L. s.	s.	L. s.
Beddington Wallington Carshalton	1200	at 14 per acre	840	at 25 pr. acre	1800
Sutton . . Cheam . .	2000	10	1000	25	2500
Epsom . . .	800	13	520	20	800
Leatherhead	2000	13	1300	20	2000
Ashted . . .	700	9	315	20	700
Fetcham . .	150	7 6	56 5	16	120
Egham . . .	300	22	330	35	525
Hythefield .	250	18	225	32	400
Thorpe . . .	350	20	350	35	602 10
Mortlake . Putney . . Wandsworth Battersea .	340	25	425	40	680
Sundries . .	135	9	60 15	16	108
	8225	11 | 160 6	5422 0	11 | 284	9935 10
		14 10½		25 9¾d.	
Runney-Mead	160	20	160	L.3 0s.	480
Yard and Long-Mead . . .	100	20	100	2 10	250
	260	2 | 40	260	2 | 5 10	730
		20		2 15	

Since the former Report was published, there have been several inclosures of common fields, as well as of the wastes in the same parishes made, and I am happy to say, that a very active spirit for inclosure seems to pervade the noblemen, gentlemen and yeomanry of the western part of the county, particularly within the last two years; no less than the following having been inclosed, or being now in the act of inclosing; Great and Little Bookham, Effingham, East and West Horsley, Clandon, Meroe, Send, &c. besides Ewell and Croydon; there are also the wastes at Frimley, Pease Marsh, &c.

In the foregoing statement I have selected the number of acres which each common field is supposed to contain, to which I have affixed the present average rent, and the supposed improved rent upon an inclosure; by which it appears that nearly £100 per cent would be gained thereby: much of the land is unquestionably good in a state of aration, some of it is superior to the inclosed land in the same neighbourhood; and many of them, from being so near the London dunghills, are forced to produce two large crops in succession, without any intervening ameliorating one. Some again, from being still nearer the metropolis, such as Battersea, Mortlake, East Sheen, Putney, &c. especially the former (every acre of which would let for 4 or 5 pounds as garden ground,) and being divided into an infinite number of long narrow slips, from one to five or six or more acres, are only ploughed up and down, the larger ones sometimes across, and being drunk with dressing, are as full of couch as it is possible for land to be; even the very beds of asparagus, onions, or whatever may be the crop, are in this vile state.

The circumstance of these fields being in a state of commonalty does not make them produce couch, and other noxious weeds, more than lands in severalty under the like treatment; but being exposed to the inroads [illegible] certain seasons, to the hazard of rec[illegible] of thistles, bents, &c. &c. having no [illegible] arate them, and being obliged to dress [illegible] der to make them sufficiently produ[illegible] he additional charges of labour, seed. [illegible] iore it is dressed, the fitter it makes [illegible] receive the contagion. That this is re[illegible] ve have only to look at the inclosed grounds belonging to those occupiers who possess and farm those several allotments in the common fields, and make the comparison, and we shall in the one case see every inch well cultivated and free from weeds, and highly productive, subject also to a very high rent; while the other is every thing that is bad. Is it not cruel to see land, whose soil and depth of staple is scarcely any where exceeded, capable of yielding the most immense crops, and which, as Mr. Middleton says, would yield a return of £150 per acre, not averaging more than 30 or £40?

Indeed, I do not know a better spot to invite the members of the two houses of parliament to, than Battersea fields, during those winter months when there is little or no corn sown, and the ground in a state of fallow; and I am much mistaken if they did not return home fully convinced, that this salutary measure has been too long delayed; and if a general inclosure would result therefrom. Such a measure would also, most happily for this parish, get rid of the tithes; which produced so long a scene of warfare between the vicar and the occupiers of these fields, that they not only forsook the church, but pulled up all the land marks, in order to lead the tithing-man into endless difficulties and perplexities; obliging the vicar to hawk the produce about the streets of London, &c. to the great diversion of many people; and although a system of moderation has fortunately followed, yet it is still remembered, and makes every man cautious how he crops his land.

With respect to the common meads, the land is not only of the first quality in itself, and productive under its present destructive mode of occupation, but capable of bearing the greatest possible crops, either by irrigation by means of the Thames, or by the usual mode of dressing grass land. In their present state they are overcharged with cattle, let the season be wet or dry, which, by being kept on them from August until March, cannot fail of poaching them, destroying thereby the herbage, and preventing its being cut so low as it might or ought to be, and does not do the cattle any sensible good.

From the most accurate calculations I am able to make after the most mature consideration, I am led to believe, that no less than £28,000 will be gained to the community by inclosing the fields I have before stated; and the quantity of corn grown will be near 34,000 quarters, of hay about 550 loads, over and above the present produce.

Viewing the extensiveness of such an acquisition to out annual supply, without sending our money out of the country, for the purpose, as it were, of enriching the different states of Europe and America, and maki [illegible] d more dependant on them; let us o [illegible] nt reflect, what would have been the [illegible] this country in 1800, or even in the p [illegible] if either from a spirit of enmity, or [illegible] e calamity pervading those several [illegible] m whence we have hitherto drawn [illegible], we could not have been accommod [illegible] st shudder at the bare idea of it; the effects would have been truly lamentable; and then I am persuaded that we should no longer have been without a general Inclosure Bill, from the universal clamour of the people. In saying thus, I beg it may be understood, that although I may speak in positive terms, yet my best arguments can only be conjectural; but they appear to me so highly probable, that I feel it an indispensable duty to submit them to the public, who I am sensible will judge of them with candour.

COMMONS, HEATHS, AND WASTES.

The commons, the heaths, and the wastes, are more profusely scattered over this county than over almost any other in the kingdom; and although many of the former, as well as the latter, are not of magnitude or consequence enough to invite inclosures at the expence of an Act or Acts of Parliament, with the other necessary expences consequent thereto; and as some of those which are near the metropolis are in their present state, cheerful, healthy, and produce a fine herbage, such as Kennington, Clapham, and Streatham, besides having so many claimants, as would reduce the several allotments so small, as to be of scarcely any use to any one individual, and consequently, may be more generally useful in their present state than in any other: such therefore I shall leave out of the question, and beg the attention of the Board to those of a different description.

The following statement will, I apprehend, give a tolerable idea of the number of acres of commons in this county.

		Acres.
1	Dulwich common	200
2	Norwood	600
3	Penge part inclosed	
4	Brixton	150
5	Streatham west	250
6	Croydon lately inclosed	
7	Waddon marsh	150
8	Mitcham common	550
9	Addington and Shirley	300
10	Hamsey green	100
11	Wallingham	500
12	Catterham	300
13	Limpsfield	480
14	Staffords wood	150
15	Lingfield	200
16	Hedge-court	160
17	Copthorn	750
18	Horley	600
19	Lowfield and Westfield	230
	Carried over	5670

		Acres.
	Brought over	5670
20	Wetherhill and Smallfield	140
21	Outwood	400
22	Red-hill	450
23	Reigate	150
24	Cadbroke	160
25	Holmwood	400
26	Leith-hill, and	3200
27	Headley	900
28	Walton, Kings d	1500
29	Sutton	250
30	Cheam	320
31	Ewel common a	
32	Epsom and Le	1200
33	Fetcham	250
34, 5, 6, 7,	Bookh bham, &c. inclosed.	
38	Pease Marsh incl	
39	Shackleford	150
40	Addlestone	150
41	Hersham	200
42	Esher inclosed	
43	Kingston	430
44	Norbiton	320
45	Wimbledon and Putney	1000
46	Barnes	200
47	Wandsworth	350
48	Egham	445
	Total	18,235

Heaths.

1	Blindley heath	50
2	Pacon heath	70
3	Felcot heath	250
4	Frogwood heath	200
5	Blackheath	1000
6	Munstead heath	220
	Carried over	1790

		Acres.
	Brought over	1790
7	Highdown heath	450
8	Wormsley and Hamilton	350
9	Hindhead	3096
10	Frensham, Thursley, and Whitley	5800
11	Farnham and Crooksbury	3700
12	Tuxbury-hill	600
13	Bagshot heath, Romping downs, Purbright, Bisley, Bookhurst green, Whitmore's smarts, Cobham ridges, Surrey hill, Windlesham, Kingshill, Woodham, Hamhaw, Horsehill, Pirford, Oakham	31,500
		47,286
	Commons brought forward	18,235
		65,521

Note—Walton, Weybridge, Red-hill, Frimley, and Woking, are at this time inclosing by Acts of Parliament.

Having thus stated the respective quantities of these several commons and heaths, without paying any regard to that portion of land which is usually called waste, my next business will be to shew, the immense value which this extensive track of land is of, or rather, may be of, as well in a political, as in an agricultural point of view, to the community at large.

As a source of revenue to the public in its present state, in any way whatever, it is impossible to calculate it; because, it remains to be proved, that it brings in any; indeed a question very naturally arises, whether it is not a positive loss to the public; but without determining the point hastily, I will merely suggest my ideas, and leave the public to judge of their conclusiveness.

We are led to believe that these commons, heaths, and wastes, are of very great advantage to the cottager and small farmer, and in this opinion, some very respectable clergymen and landholders, in a neighbouring parish to this place, are strongly prepossessed; with them I have often argued the point, and submitted the following to their consideration; but [illegible] conciled them to encroachment, a[illegible] y could not but admit the force of the[illegible], yet, rather than see any alteration [illegible] deprive these people from doing wh[illegible] cessors had done, they were willing to [illegible] r own rights. But, as this speaks only [illegible] nts of a part of one parish, I shall [illegible] To a poor man these commons, &c. offer an opportunity of erecting his little cottage, to take a slice of a certain common, and to inclose it, which he cultivates and makes by dint of labour productive; having done this, and having waited for a proper opportunity he takes a larger slice, which is usually done when the hedge is repaired, and this is called niggling or coaxing, incloses that also, which he brings into pasture for his cow; all this he does with perfect ease of conscience, because, apparently belonging to nobody, nobody can be hurt: but mark the progress of this proceeding; he takes in the first place to himself that which belonged to some other person; probably too, he takes from other persons, perhaps his master, some part of the materials wherewith to build his cottage, and the stakes that furnish him with fencing may come in the same way; he buys a pig, some poultry, and afterwards a cow; the pig, the poultry, and the cow, in a hard winter cannot live without food; does he go to market to buy this food? or rather let us ask, whether, with a wife, and a young family about him, he has the means to buy it? If he has not, how are these things obtained, and how supported? Does it want further elucidating? The first act was robbery, and that led to every succeeding one. But let us examine a little further, and see if we cannot trace the origin of this matter, and place it to its proper account.

This labourer then in an unguarded moment, and in the warmth of youth, had committed some imprudent step with some neighbouring girl, as poor, as young, and till then perhaps, as innocent and virtuous as himself. As soon as the girl is discovered to be in a situation to bring a burthen on the parish, she is brought to confess the father, the poor fellow is hurried away before the magistrate, and having neither money, nor friends to lend him any, he is obliged to marry this girl as the proper reparation for his indiscretion. She however loses her place, because in fact her situation will not admit of her retaining it; the little money which she may have to take from her mistress will scarcely buy necessaries for the infant; and her future, as well as sole dependance perhaps, during her accouchement and convalescence, is upon the hard but pitiful earnings of the husband. If he is a farmer's man, 12*s*. a week is the most he can earn, but having lodging or house rent to pay out of it, he finds that his earnings will not support them. Firing he must have, if it prove the winter season, and so they must have in summer so long as the woman continues a nurse; every spare half hour therefore, that she can devote to the employment, is to go about the hedges and pull them to pieces, taking care to mangle any young trees or branches of old ones that may fall in the way, in order that they ma [illegible] under by the wind, to provide this fi [illegible] have hitherto lived in lodgings, whi [illegible] st probable case, and if they should l [illegible] mon, he then begins to collect materia [illegible] cottage, to hold his increasing fan [illegible] re house rent; and it is not unusual fc [illegible] to hold out some encouragement [illegible] y the promise of being something towards [illegible] expence of putting these materials together. Thus, it will appear, that the cause of this encroachment originated in an imprudent act of the parties themselves, who are afterwards driven to a state of desperation by that cruel policy which obliged them to marry, whether they would or not, whether they liked one another or not, and without having perhaps had it in their power to make provision for that day, which is to intail upon the remainder of their lives the most consummate bliss or misery: hence, in my humble opinion, proceeds that serious evil which every farmer suffers, who lives upon the borders of a common, a waste, or a heath.

I know of an estate in Worcestershire, where nearly the whole parish, which is not very large, is the property of one gentleman; it is bounded on the south west by a large common of a fine loamy quality, about three feet deep upon a sand rock, over which he has the manerial rights; and on or near which, within the memory of many of the farmers on the estate, neither hut nor cottage was to be seen. The owner, being an officer in the army, and having been in active service during the two last wars, and consequently unable to visit his seat, found on his return home at the termination of the first, that several comfortable cottages had sprung up on different parts of the common, particularly on that side next his park. Upon enquiring among his tenants how they happened to permit it, as well as of his bailiff, since they might be injurious to his estate, some of them gave the reasons which I have just depicted, and others, that the distance from the nearest village was so great to the place of their labour, upon their farms, that the men always made that as an excuse for their want of punctuality in attending to their several duties. They not only saw the benefit that would arise to them individually by having these cottages erected, and by having their men more handy to them, and consequently more at command, connived at, and in part aided the encroachment; but oftentimes winked at the cutting down a few of the colonel's saplings, or pollarding a thriving ash, to make rafters and uprights to these cottages. Being a man of philanthropy, and not being aware of the consequences, he submitted to the reasoning of his tenants, and suffered the several encroachments to pass by, with only an injunction to the cottagers, to take care of his fences and his young timber. At the close of the last war, he found an addition to his neighbourhood of seven or eight cottages more. Now mark the consequences of this false acquiescence.

After he had been a little time at home, he found the whole estate gone so much to ruin, that he determined to begin a general system of improvement, and he did me the honour to consult me upon those improvements. A part of our plan was a bold belt on the south west side of the park, straightening the exterior lines by carrying out all concavities, in order to shelter that side of the park which was situate on the brow of a high hill. In continuing our line along the common, we passed by the front of these cottages, leaving a proper carriage way to them; we were also put to the additional expence of a fence immediately in front of them. This was composed of live, white, and black thorn, carefully taken up from some old fences which were removed to enlarge interior old inclosures, or to extend the park, and they were planted with all imaginable care. Some time after this part of the plantation was made complete, and the nights had become dark, as if by conspiracy, a great part of this fence was torn down, and removed some distance from the ditch. It was no more than I had expected, and I had from the first prepared the colonel for it; but he could not be brought to believe, that people whom he had never offended, and whose cottages he could pull down, and the inhabitants turn out at his pleasure, would be guilty of such an act: all his endeavours however proved abortive, for although he offered a very large reward, he never could find out the parties who had been guilty of this wanton act.

We could however very readily perceive that they were averse to our proceeding with the plantation and the inclosure, and there was every reason to be satisfied, that every one of them had been parties in the demolition of the former fence. They were therefore warned of the consequences of such future acts of violence, and as they knew the colonel to be a determined man, and one who was not to be deterred from his object, by those considerations of opposition or losses which might have alarmed other people, he gave them to understand, that he should repair the fences and go on with the inclosure, and that every one of the cottagers should have the liberty, during their good behaviour, to plant a certain portion of the ground with cabbages and turnips, &c. upon condition that they did not injure the young trees, that they kept the ground clean, but above all, that they did not suffer the hedges to be destroyed. Every one seemed pleased with this proposal, and some of them began to dig the ground between the trees for their own use. The colonel thinking that he had at once found out and cured the evil, went on with increasing activity with his inclosures and planting; when, just as the plants were beginning to shoot, and the fence to exhibit the same appearance, both the one and the other were suddenly torn up, and lay some days it was thought, exposed to the cold and dry winds of March. Enraged more than ever at this last piece of treachery, he offered every bribe to discover the authors, but without effect, and he was at last obliged to pay each of these cottagers a certain pecuniary consideration for the liberty of planting his own commons, and for his weakness in having had no confidential person to superintend his concerns during his absence, and in having given a certain degree of sanction to the erection of those cottages which he found built on his first return home.

I have been l t length by a detail of
this circumstar an assure the public is
fact, and the g me I am ready to give
as a corroborati t I brought it forward
merely to shew se days even cottage
rights originat ects which these have
over the prope oining estates; and it
shews also the every land owner, or
his agent, never mallest encroachment,
lest that encroachment should rise up at some future period in judgment against him, and prevent any further arrangement or improvement of his estate,

I am the last man who would be desirous of erasing the dwelling of the cottager from the map of society, because I well know that society, as it is now formed, could not do without them; notwithstanding they are too often the abodes of wretchedness and plunder, and like the picture so ably described by Mr. Gilpin. "We expected, says he, to find in the lonely cottage, in a sheltered glade, the abode of peace and happiness, but we found that a happy scene will not always make happy inhabitants. At the door stood two or three squalid children, with eager famished countenances, staring through matted hair. On entering the hovel, it was so dark, that we could at first see nothing. By degrees a scene of misery opened. We saw other ragged children within, and were soon struck with a female figure groveling at full length by the side of a few embers on the hearth. Her arms were naked to her shoulders, and her rags scarcely covered her body. On our speaking to her she muttered in return a mixture of obscenity and imprecations. We had never seen so deplorable a maniac. We had not observed when we entered what now struck us, a man sitting in the corner of the hovel with his arms folded, and a look of dejection as if lost in despair. We asked him who that wretched person was? she is my wife, said he, with a composed melancholy, and the mother of these children; he seemed to be a man of great sensibility, and it struck us what distress he must feel every evening after his labour, when, instead of finding a little domestic comfort, he met the misery and horror of such a house, the total neglect of his little affairs, his family without any overseer, brought up in idleness and dirt; and his wife, for whom he had no means of providing either assistance or cure, lying so wretched an object always before him. We left him strongly impressed with his calamity, which appeared to be a more severe visitation than the hand of heaven commonly inflicts. On relating our adventure at supper, we were informed that the man whose appearance of sensibility had affected us so much, was one of the most hardened, mischievous fellows in the country, that he had been detected in sheep stealing, that he had killed a neighbour's horse in an act of revenge, and that it was supposed he had given his wife, who was infamous also, a blow in a quarrel which had occasioned her malady. Through such strange fatality do mankind become themselves the ministers of those distresses, which Providence would never have inflicted upon them."

Having established one point, namely, the origin of the cottage erbage upon the common, let us ralue of the common through the co iblic: he keeps a cow, and some pigs. turned out to get what they can upoi n; some commons are much more v hers both in soil, herbage, and dry or dry, good or bad, they are alike these cottagers; the wife takes this charge upon herself, while the husband follows his day labour, when he can find work; when he cannot, he must do something else, perhaps part of the time he cuts turf from the common, or furze, or what not, for the use of his cottage, which no man will, I think, venture to say that every cottager has a prescriptive right to do; but perhaps, the other part of his time is sottened away at the neighbouring pot-house, where his morals become more vitiated and contaminated than they were before.

When this turf is pared off from a thin skinned soil, it is sometimes succeeded by herbage or heath, but generally by the latter, but it is frequently under water. The paltry produce of the cow goes to support the family with food, and also affords some for the pigs; but as milk alone will not fat them, they have recourse to some farmer's barn, or some farmer's fields or ricks, from which perhaps as much is selected as they may want. It is evident that neither the cow, the pig, nor the poultry could be kept on this common without the occasional assistance of some neighbouring farm. Their fare must be poor, and their pittance very small, without some such assistance. Does the barn door stand near the street or the road, the master is sure, let him be ever so vigilant, and let him have who he will as labourers, he is sure I say, to be plundered some part of the day or other, either by some of these cottagers, or by some persons in league with them. In fact, sorry am I to say, that the depravity of most of the lower orders of labourers is arrived at such a pitch, that it is hardly possible for any farmer to say he has a servant about him so honest as neither to pilfer himself, nor to suffer any other person to do it. If therefore this cow, pig, or poultry are to be occasionally supported by the produce of inclosed or of cultivated land, and if the possession of this independent cottage, which is the pride of these people, gives the owner a disposition to work only when he pleases, and play as often as he likes, how much benefit does the public derive from this common through the medium of the cottage; for as soon as the children can walk, almost their only business is to procure wood, and to pull up fences, either new or old, that they are able to do, and hence instead of being brought up to industry, their very introduction is to robbery.

Having thus disposed of the supposed advantage accruing to the public through the medium of the cottager, in a way which I apprehend decides the question, we come next to consider the advantage which may arise to the farmer, and the small freeholder or yeoman from these commons.

As they no doubt keep a stock of some kind, cows, steers, sheep, or colts, perhaps a few of each, such men are always unwilling to have these commons inclosed, because they would lose and give up thereby e, if it could be so called, of a ra ndred acres, more or less, when, by a they must be content with such a por can be proved to be their absolute r ore, say 10, 20, or 30 acres, and e shews them, that what they may b een doing has been a positive encro the rights of others, and contrary to that sacred and divine law which ordains, that we should do unto others as we expect they will do unto ourselves, which, in other words, is to be strictly honest, and to take no more than belongs to us. But what is the practice? unless the common be what is called stinted, the farmer who is immediately on the spot may run away with all the little advantages which at any particular season of the year may belong to them. If the common is dry, and his farm is large, he may overstock it with sheep by day, and remove them to his fold at night, or perhaps into his inclosures; and he may overstock it with cattle, feeding them occasionally, as he pleases, and which his immediate contiguity to the common enables him to do. His cattle therefore may not get worse, although I am persuaded they do not advance much; but if his cattle collectively are more than sufficient to keep the common bare at all seasons, what then becomes of the cattle of the more distant farmer and the cottager? and especially during the wet and cold months, when many of them are so wet that almost every step the cattle take may be said to be in a pond; and very few indeed there are in the east and south parts of the county that are not quite so; what is Warlingham, Lingfield, Hedge-court, Copthorn, Blindley-heath, Horley, and many others, where at times the whole is nearly one sheet of water? Can it be possible that cattle of any sort, unless they were allied to amphibiousness, should thrive in situations like these? Whatever little advantage they may derive in a prime month or two, is more than lost in every succeeding one, by the serious effect which the poverty of this fare has upon the growth of the animal. But we know also from sad experience, that if sheep are suffered to range these commons the latter end of the year, the winter or the spring, they are not only liable to be half starved, but they are subject to a worse malady, namely, the rot, and what is termed the foot rot: the latter, however, may be cured, and so possibly may the rot under certain circumstances; but no person, who is a judge of the matter, will choose to buy sheep afflicted with either; nor will he buy them at all, even if they are thought to be sound, if he knows the sort of ground they have come from, without a warrant. If therefore, under these circumstances, the farmer should lose one out of twenty by any of these disorders, I would fain ask where is the profit to the public through the medium of the far-

BIBLIOTHECA BODLEIANA

mer; for we find, that even the neighbouring ones see the necessity of feeding them regularly, to keep them from going back as they call it; indeed, there are several farmers in the parishes of Lingfield, Burstow, Horley, &c. bordering upon these commons, who never turn out a single thing, because they are of opinion the[illegible] restless, unconfined disposition and [illegible] added to the small benefit supposed [illegible] obtained, very often proves a loss in [illegible]d of gain.

When the c[illegible]ry as Felcot-heath, they are usuall[illegible]h heath, and some of those in the west[illegible]warf furze, as well as heath, and it is [illegible]aths and commons, where we find the cottager and the small farmer constantly at work, paring and cutting the heath and the furze, with any small semblance of pasture for fuel, so that you may ride over scores of acres without seeing a blade of good nourishing grass; but perhaps I may be told that cattle eat the tops of the furze, and that it is both wholesome and nutritive, to which I give my most cordial assent under particular circumstances; but do they ever eat the heath which every where prevails above 50 per cent over the other produce? Take it therefore, under all the present circumstances, that the commons are so few where 3 or 4*s*. per acre can be made of them, in point of profit, that I can venture to assert from my own observation, and the information I have collected from dispassionate people, that they are a present loss to the public, by the deterioration of the cattle, the losses that often attend them, the habits of encroachment and indolence which they induce in the farmer and cottager, to say nothing of their being receptacles for gypsies and thieves of all descriptions. My Lord Kames, whose Gentleman's Farmer proves him to be no stranger to the subject on which he wrote, and whose authority, as well at the bar, as in the corn field, was always listened to with reverence, thus expresses himself. In speaking of preparing land for cropping, "I cannot conclude, says he, this article, without inveighing against the commons in England, which produce very little, and are destructive by increasing the number of idlers who subsist by charity. An Act for dividing them, as in Scotland, would give work to many thousands, would increase population, would add greatly to the land product, and no less to the public revenue."

Sir John Sinclair, Bart. to whose extensive knowledge and unwearied application the Board of Agriculture owe a great deal of that consequence which, as a public body, they have so justly acquired all over Europe, has in his address to the Board, of July 1794, with his usual discrimination and perspicuity, selected from Mr. Vancouver's laboured report of Cambridgeshire, certain data upon which he has founded his calculations of the number of acres of waste lands, and the number of acres of common field land in this kingdom, including in the latter that portion which is made defective cultivation. The total number of these three species he supposes to be 22,351,000, one half of which, or 11,175,500, he denotes waste, the other half common field, and unproductive in a

certain degree, and he calculates a value upon these founded upon Mr. Vancouver's valuation of Cambridgeshire. Much as I feel disposed to venerate the honourable baronet's opinion in other cases, yet in the present instance, I can by no means assent to the whole of his statement, much less to the conclusion; because Cambridgeshire, as he partly
admits, is a co iarly its own, marked
with so great a character, especially
when compared hern or western counties, that it is by iterion to affix a standard to regulat by. I even doubt
whether the cou dge itself will bear out
Mr. Vancouver Will the counties of
Norfolk, Suffol ent, Sussex, Hants,
Berks, Wilts, or Somerset, bear an addition of rent of nine shillings per acre, communibus agris, or would they at the period of his address? much as the rent of particular farms have increased since then, I do not believe, that it has upon the average, greatly advanced the capital; or in other words, if the money price of an acre of land has increased from 15*s.* to 20*s.* the fee simple has not increased from 27 to 30 years purchase upon the improved rent; I rather suspect it will be found, that if it was worth 30 years purchase at 15s. per acre, the number of years purchase will be reduced to 26, or at most 27, at the improved rent; the calculation would therefore have been nearer the mark to have proceeded thus:

11,175,500 acres of waste, worth when inclosed, upon the average per acre 7*s.* £3,911,425

11,175,500 acres of common field and improveable land at 8*s*. per acre ..	£4,470,200
Additional produce, at 22*s*. 6*d*. per acre	25,344,875
Additional to the national capital, at 27 years purchase of the produce ...	684,311,598

Taking a view of all the wastes with which I am acquainted throughout the kingdom, and those, which from the several County Reports I am able to calculate, I submit with great diffidence, that they would not fetch upon the average more than seven shillings per acre, and many of them would be dear at that; though I do not dispute that some may be worth fifteen shillings and upwards; upon the whole, I think I shall stand acquitted among my brethren of the profession for advancing the position, that the kingdom will neither bear an addition of nine shillings per acre, nor as little will that improved rent be worth any thing like 30 years purchase. In all calculations which have not estimates in view, I am persuaded that it is the safer way to err even on the lower scale.

Whatever may be the expence of improvements on land, I am far from thinking that it ought to be deducted in a national point of view, or to the full extent of it from the amount; for the money so paid away is only changing hands among ourselves, and that with accumulated advantage and interest through every one of them. It is not like foreign merchandise, which requires a Policy of Insurance to be opened at Lloyd's at a premium of £20 or £50 per cent upon the raw materials, for principal, interest, risk, and profit, to ensure its safe conveyannce, after having sent so much of the capital of this country abroad to purchase this merchandise to the enriching of foreigners; while every step that is taken with the other, enriches and improves the face of our country, and makes us every day more and more independent of foreign nations.

I have been [illegible] this calculation of Sir
John's, previo [illegible] ng an attempt to ascer-
tain the value [illegible] s and commons in this
county, becaus [illegible] my readers some ideas
of the reason o [illegible] which I found my esti-
mate; but bef [illegible] d to that, one grand
question natur [illegible] o which I beg the at-
tention of the b [illegible] as those worthy cha-
racters in the pa [illegible] ield, who are for having
the very extensive commons in that parish remain in statu quo; though neither of them make the smallest use of them. Do they find any the most distant employment for the wheelwright, the blacksmith, the millwright, and miller, the carpenter, bricklayer, and glazier, the flax-dresser, the spinner, the weaver, the hedger and ditcher, the drainer, the ploughman, and thrasher, with a hundred other professions subordinate and appendant on them? Is not therefore the loss which the inclosing these commons would necessarily furnish to all these descriptions of persons, in a national point of view, a serious evil, and would they not far exceed the present paltry advantage which may arise to a few individuals for the privilege of cutting turf, heath, &c. and starving a few miserable cattle, thereby keeping just so much additional capital as their cultivation would throw into the

national stock, dormant and idle? I am clearly convinced in my own mind that it is, and I hope by this time they are equally so; but let us throw the whole of these into cultivation, in some way or other, and then see how the account stands.

We have seen that in the article of commons, there are 18,235 acres, and of heaths 47,286 acres at this time uninclosed, making together 65,521 acres, these we will dispose in the following manner, in order to come as near the truth as we can; and I am inclined to think, that from what I have seen of their quality, they will bear me out in this distribution of them.

	Acres.	
From	18,235	of commons
Take	6,783	for meadow and pasture.
	11,452	for arable.
From which take	452	for hedges, ditches, ponds, pits, buildings, roads, &c.
For the sake of even numbers	11,000	for complete cultivation under the plough.

Suppose that out of the 11,000 acres one fifth to be always under fallow, and the other four fifths to be either in wheat, beans, peas, barley, oats, tares, clover, and turnips, &c. and their produce I estimate at the sum of £56,650 sterling, per annum.

	Acres.	
Again say ..	6783	for meadow and pasture.
Take	383	for hedges, ditches, roads, ponds, gravel pits, buildings, &c.
	6400	

Suppose that each acre produces one load of hay, and one load of rowen, these 6400 acres will yield an annual return of £28,800, which added to the arable £56,650, will make a produce equal to the sum of £85,450 sterling; the value of the straw will defray the expence of harvesting and fitting the corn for r [illegible] he additional feed or depasturage on [illegible] nd pasture ground, together with the [illegible] of a certain portion of the hedgerow [illegible] will more than pay the expence of m [illegible] The offal corn I consider to be mo [illegible] to the value of the seed returned to th [illegible] l if we deduct the expence of plou [illegible] und, &c. we shall come at the net value [illegible] oduce, exclusive of rent and taxes. This expence of ploughing, &c. may be reckoned at about £8850, to be deducted from the sum of £85,450, and there will remain a clear gain to the public by the inclosure in question, of the sum of £76,600 sterling, per annum.

We have now to estimate the heaths, and these we have computed at 47,286 acres.

		Acres.	
Say from		47,286	take
For pasture ..	50		
For plantation	34,296		
For hedges, &c.	440		to the arable part only.
		34,786	
Leaving		12,502	for arable, and being divided as before, or $\frac{1}{5}$ always in fallow, that is, about 2500 acres, there will then
remain		10,000	acres to be annually

in wheat, oats, barley, peas, beans, tares, turnips, clover, and seeds; these I compute will bring products of the annual value of £61,950, from which deduct the expence of ploughing, harrowing, sowing, &c. £8000, and it leaves us £53,950, to which are to be added £225 for the 50 acres of pasture, and £1650 for the plantations, and the total value of the heaths and commons will be thus:

	£
For commons, including pasture and arable	76,600
For heaths, including do. and plantations ..	55,825
	£132,425

Producing	37,050	qrs. of grain annually,	
and	15,650	qrs. of pulse,	
and	4,400	loads clover and seed hay,	
and	1,300	acres of turnips.	
Common fields ..	24,500	qrs. of grain	valued at 28,000
Ditto ...	9,000	qrs. of pulse	
Ditto ...	550	loads of hay	
Ditto . .	500	acres of turnips	
			£160,425

I have thus endeavoured to bring under view a plain state of facts, from whence it appears, that inclosing of the commons, heaths, and wastes that are now found in the various parts of the county, converting only into tillage such parts as may be more immediately fit for the plough, laying down into permanent pasture all the strong and heavy parts, and planting all the hilly parts that may be either inaccessible to the plough, too light or too thin, will yield a revenue of £132,425, and in corn and pulse 52,700 quarters, besides food for cattle of 4400 loads of hay, and 1300 acres of turnips, say, 26,000 tons, to which we have to add the increased produce of the common fields, and the total annual revenue would be not less than £160,425, a considerable, as cannot fail to arrest f the Board.

It will hav d effect, it will for ever set at rest idea of encroachment, which I trus iently proved pervades the whole bo er orders of the people. If more cotta necessary, either now or at any future em be provided for on the several farms, or by the parishes in a proper way, but let it be so ordered that we have no more trespassers, for as a judicious author says, "trespassers on wastes cannot be prevented but by "great attention; the first trepasser is criminal; his "act is a robbery: but if those who should punish "it suffer it to remain, their forbearance gives "confidence to his title. He is permitted to go to "market with the fruit of his crime, and time having involved that crime in obscurity, those who "succeed to his possession cannot be deemed parties "to it.

"To punish such for having purchased what "could not have been offered to sale, if those who "ought to have prevented the trespass had done "their duty, is the extreme of rigour.

"If 'tis our fault to give the people scope,
"It is our tyranny to strike and gall them

"For what we bid them do. For we bid this
"Where evil deeds have their permissive pass,
"And not their punishment.

The following observations made by the ministers and officers of King James the first, are so extremely pertinent, that I cannot conclude the subject without bringing them forward.

The forests, say they, if inclosed, would be more secure for travellers, more profitable for the inhabitants, and more beneficial to the commonwealth. Whatsoever benefit arises uncertainly, of what yearly value soever, if this benefit may be increased and made certain without prejudice to any, there is neither reason nor common sense in him that opposes it. These waste grounds, as now they are used, yield not to any that certain or uttermost value they justly may; therefore, to alter the use of them, and make them more profitable to those particular men whom they concern, and to the whole weale public, is a lawful, charitable, and consequently a work most worthy, and of no danger. And if reason and common sense allow it, law cannot but allow it. Lex plus laudatur, quando ratione probatur. It cannot be denied that wastes and commons are of some use in the maintainance of families, yet, as manurable lands are of much more, to continue the former in the same state would be to continue an inconvenience, that a mischief should grow. The inclosures already made have been made by degrees, as the kingdom increased in people; and as they have increased, commons and wastes have decreased; but if they had not been found more profitable, the inclosing of them had been a needless trouble, and a superfluous charge. The three principal arguments made use of to maintain commons-antiquity, the multitude, and a common consent, are pillars that support many abandonable customs, and each of them rather infers and implies an error than a truth; but leaving to pr [illegible] apparent and impertinent to the [illegible] it is certain that *if* inclosures are [illegible] le (as is allowed) they are to be pre [illegible] nons, whose use is only to pasture c [illegible] no profit to the owners: and in a mis [illegible] must be, who have no other pasture [illegible] ch kine and labouring oxen; for on [illegible] t, in grounds inclosed, is worth, in profit, two pasturing in commons; and one ox, well fed in grounds, will perform more strong labour than two commoners. The more commons are continued, the less remains for tillage, mowing grounds, and for pasture for feeding cattle for diet. And though there are sufficient supplies (for money) of beef and mutton, for many, yet the poorer sort, by the excessive prices of these kinds of victuals, find not sufficient of either; but if the means to feed were increased, the prices thereof would decrease; then the poor labouring man, that is now forced to feed on roots and other weak food, might sometimes be refreshed with these kinds of more strong and nourishing meats. If it be objected that the farmer would suffer, if, through abundance, the prices should fall, the argument proves too much, for by this reason it were best to make a less number of inclosures, to make sustenance dearer, that farmers might become richer by oppressing the poor, with unconscionable rates of the things they sell for human relief. It is not the increase of inclosures and improving of wastes that would make farmers less, but more able, to afford more reasonable prices of all their vendibles, and to maintain their estates as well as they do now; for so long as human creatures increase, there may be a want of means to relieve them, but never of means to vend what the earth yields for food. But to return to the subject; it is allowed that two acres of land inclosed are worth three in common fields, (so that these were much better inclosed), and 40 acres in common fields better than 100 in a waste common, if the land be in both cases of equal goodness. Inclosures then are better than common grounds by almost one half. Can it be a doubt then whether they should be inclosed, since the commonwealth loseth near £1000 in £2000? Perhaps it may be said it were better they were inclosed, yet not best to inclose them, because innovations are harsh and distasteful to the multitude: but admit a man was born deaf, or blind, or lame, would he distaste it that he should be made to hear, to see, or to go sound, because it were a novelty to him to enjoy the benefit that before he had not?

The spacious forests, chaces, and wastes in England, if royal consent, and the vulgar, whom it concerns, were conformable, might be improved to upwards of two millions per annum. And let all the benefits that are at this day, viis et modis, made by all the lords and inter-commoners in England, of all the wastes within the same be laid in a balance, the less than one fourth part of a million will more than counterweigh them all; so that the commonwealth loseth near seven parts of eight. Suppose an instance of a waste of 5000 acres, to which admit to belong 500 commoners (which were very much, for there are wastes of 40,000 acres that are not charged with so many,) and suppose 450 of these commoners to [illegible] acres of manurable land in his possessi [illegible] ther 50 being cottagers, to have five [illegible] whole then of their manurable lands [illegible] to 17,250 acres; more than three t [illegible] ntity of their common. Each comm [illegible] eep no more cattle in summer than [illegible] in the winter, with the produce of t [illegible] ight whereof he claims common of pasture. As tillage is the most necessary and profitable method of occupying land, each farmer of 40 acres, assisted with the common of pasture, may be allowed yearly to sow 15 acres, and to fallow seven; to manure which, four horses must be kept, at two loads of hay each per annum. If there are six milch kine kept at one load of hay each per annum, the 14 loads of hay will require 10 acres of meadow, so there only remain eight acres in pasture for kine and labouring cattle, that are not wholly to rely upon the commons; if then the cattle, which are only ten, eat up the most part of the hay and straw raised upon the 40 acres, what other profit can arise by the common, except from young cattle, and foaling mares, which are generally almost starved, and very little worth? But allow to each farm of 40 acres 10 such beasts to be fed on the common, which is almost a beast to every acre, they cannot be valued at above 3*s.* 4*d.* per beast's leaze, which is about 3*s.* 6*d.* per acre, so the whole 5000 acres yield about £866 per annum. And the proportion arising to each tenement of 40 acres, for their respective 10 acres of common, is 33*s.* 4*d.* These wastes, if inclosed, would be worth at least 10*s.* an acre; but in their present situation (if the truth were known) scarcely half what they are valued at above; so there is lost at £2000 per annum by suffering these 5000 acres to lie common. What a mass of wealth then does the commonwealth lose by all the waste grounds in the kingdom? Again, to permit every man to inclose at pleasure, would be to feed the wills of the wilful, and to admit a confusion, as each would contend for the most and best, the strongest would oppress the weakest, and the lords and owners giving up their rights, and conniving at such encroachments, would breed an intolerable presumption in the encroachers, which they would imagine proceeded wholly from fear of their disloyalty, wherein they might break out into rebellious courses, if restrained of their wills."

Adam Smith, b. III, p. 507, says, "the cultivation of this country is very inferior to what it might be, though superior to that of most other nations. Many circumstances concur to render this country peculiarly capable of improvement; the variety of its soil, the industrious and enterprising spirit of its inhabitants, the civil liberty which it enjoys, its commerce, its extent of coast, its inland convenience for carriage, both by roads, navigable rivers and canals, all conspire to facilitate the progress of agriculture. What then are the obstacles which impede the course of this great salutary work, the cultivation of the forests and wastes?"

One objection, often urged, is, that the bringing of so much land to market would lower the price of that species of property. Supposing this to be true, why are we to consider such an effect as a public evil? That it might be prejudicial to individuals who 'ant to sell their lands, may be true to 'ee. But the nation is no loser by the e money price of land, when the fall f the commodity proceeds only fro n extraordinary plenty of it. It is tr nking of the value of lands, if it pr heir being exhausted, from a want of ck, or industry to cultivate them, or from an inability to dispose of their produce, would indeed be a public calamity. But if land were to be purchased cheaper, only in consequence of a greater quantity being brought to market, I am at a loss to see how this could be a public grievance.

"The impediments to the acquisition of a property in the land, says St. John, and not the want of will or ability to cultivate, have prevented the extension of agriculture. Let allotments once be made, there is no fear that the land will be improved, and that the inclosure will be popular. The people will see their true interests; they will find themselves in possession of a real separate property, which they may enjoy and use without any controul or limitation, much superior in value to their former rights of common."

Again, says Adam Smith, "no equal capital puts into motion a greater quantity of productive labour, than that of the farmer; not only his servants, but his cattle, are productive labourers. In agriculture also, nature labours along with man; and no equal quantity of productive labour employed in manufacture, can ever occasion so great a reproduction. In them nature does nothing; man does all. Of all the ways in which a capital can be employed, that of agriculture is the most advantageous to society."

The value of such lands he thus computes, "Where cultivated lands sell at 30, uncultivated lands may be expected to sell at 40, 50, or 60 years purchase. Many are for getting whatever can be raised by the sale, esteeming the high price of money as a balance to the low price of land. Many are for selling so much only as is necessary to raise a fund for the improvement and cultivation of the remainder; and others may be for raising a considerable sum by the granting of long leases, an estate for 99 years, being within half a year's purchase, as valuable as the fee simple."

DRAINING, OR GEOLOGY.

Among the very first considerations of every well ordered estate, is that of its being laid properly and sufficiently dry at all seasons. It is to no purpose to be at great expence in cleansing, fallowing, and manuring it with the most costly dressings, or in procuring the very best seeds for it, if it is to be suffered to be under water, or to be super-saturated with wet. In land that is of a strong holding nature, lying in a bottom nearly on a level with the common and ordinary water mark of a river, as in some parts of Oxted, Tanridge, Crowhurst, and Lingfield, Horne, Burstow, and Horley parishes, the farmer has but little choice; but in that little he may shew either his skill or his industry, or both, and [illegible] some degree the want of a more f [illegible] on. He may lay such land down t [illegible] at present under the plough, and [illegible] s attend to his external and internal [illegible] water courses, particularly the forr [illegible] it to be large and deep, and always [illegible] free from every sort of interruption; [illegible] ppens to have an awkward neighbo [illegible] o often is the case, he may assist his own land a little by removing temporary obstructions in the ditches of his neighbour, or by an appeal to the Quarter Sessions, if those obstructions are of serious import, and if he points out the cause, and the extent and consequences of the evil, and prays for relief, there is no doubt but the magistrates will grant it.

If the land lies with any declivity, as almost the whole of the country does beyond the ridge of hills to the end of the county, there is no difficulty in keeping the greater part of those lands dry, even those places which are springy, as most of them are on the sides of hills, these springs may be cut off by tracing their sources, and using the proper means, and in some instances the water may be collected and applied to the purposes of irrigation.

SYSTEM.—Draining is performed in a variety of ways, according to the quality of the soil, the abundance or scarcity of materials with which it is to be done, according to the interest which the party may have in the property, and according as the land may be more or less upon a declivity, and intended for aration, or for permanent pasture.

And first, the quality of the soil in which draining is most required, is the strong loams and clays, but sandy, gravelly and calcareous soils also, where the substratum of the former is a yellow ochreous and tenacious clay, these often abound in springs. The custom of the south-east district is simply to open the ground at the lowest side, and there to make a large open drain, then with proper draining tools, which consist of a spade nine inches broad at top, reduced to six inches at bottom, a scoop, a drag, and a common No. 5 spade, they begin at the bottom, working upwards, so as to intercept the course of the spring or springs; these drains are first opened with the common or draining spade, of such a width at top, that when it has got to the intended depth, it may, after the stones, bricks, &c. are put in, have a clear water course of six inches: thus diminishing in width from the surface to the bottom; in those cases where sods of turf are used instead of bricks or stones, a shoulder is left or made upon which the turf rests. If the bottom of the drain is of close texture, flat stones are sometimes placed diagonally, one end resting upon the shoulder, the other, or upper end, against the opposite bank or side of the drain, and the mould being carefully put in, leaves a large cavity for the water course. Black and white thorn, where they abound, are often used, and then both sides of the drain are made smooth, diminishing gradually without any shoulder; and when they are put in, straw, either wheat, rye or bean, is laid on the thorns, which keeps the mould from crumbling into the drain. Chalk is in some places used as a covering over flints for a channel, with great success, and hollow bricks; but the latter are generally too expensive. These drains run from three feet deep to five or more feet. Drains constructed with black thorn cost from £3 to £4 per acre, and will continue sound for 20 years and upwards; but those made with sod seldom last longer than 10 or 14 years, but then the expence is not more than from 30*s*. to 50*s*. per acre; the price of all these sorts of drains must vary with the number necessary to perfect the work, but those which I have offered will be sufficient for a guide.

Open drains are not very often to be met with, owing, as the farmers say, to the damage which sheep particularly are liable to suffer by falling into them, when these happen to be in their pasture grounds, and which are occasionally grazed by them as well as by cattle.

The system is by no means understood by the major part of our farmers; for in many instances no notice whatever is taken of the source; the only attempt seems to be to carry off the superabundant water as easy as they can, and these are by perpendicular parallel drains, cut as it were by chance; even the level of the bottom of them is not sufficiently attended to, by which the current is often impeded, and is the cause, no doubt, of their blowing up. As the drainer is supoosed to understand his business, much of the direction of the process devolves upon him; it should be his particular care therefore to examine well the ground, to see if the wetness proceeds from springs, or rain waters; if the former, he must endeavour to discover the source, which on hills may be done, by attending to the vapours or mists which rise of an evening, and will be found to arise much stronger in those parts where the springs prevail than on those where the land is quite dry; so again, in rimy and foggy mornings, wherever a spring proceeds, the rime will be more speedily dissolved than on those parts where there is none, because (as Count Rumford observes) moist earth, being a better conductor of heat than earth that is dry, the heat of the earth will be more quickly directed and drawn upwards, in such springy places, to melt the rime on the surface.

It is a common observation made by drainers, that in all low water courses where the Veronica or brook-lime, and water-cresses, sisymbrium, abound, and which become nearly dry in the summer, (as those in Crowhurst particularly, and on Laggam farm, in Godstone parish,) it will be very readily perceived from whence these springs proceed, for their leaves almost invariably follow the course, and never oppose it; by observing so trifling and minute a circumstance during the winter months, we may be sure of an infallible guide to direct our operations.

The wetness that proceeds from rain waters is by much the most difficult to cure; if it happens to pervade the sandy, gravelly or chalky soils, whose substratums are clay, as from Tilburster and Godstone to Dorking, and from Reddlesdown to Ewell, the number of drains must of necessity be increased, which indeed is generally practised, because it will be found that a few will not be sufficient to draw off the redundant waters. In several of these places I have met with veins of chalk and sand which were c rsected by others of clay; sometim un in nearly parallel directions, su would be most easily drained by a f ts, and here and there a perpendicula ng these, made deeper. In some instanc ome soils, the plough called the dra some the miner, and also the one le plough, which has been used by my friend Mr. Smith, of Wilderwick, will effectually drain the land for several years. I have met with some that had been done above six years, that were then running with great freedom, and in a stream so copious, as, in my opinion, might have been diverted to the more important purposes of irrigation, but which was suffered to pass away, to inundate, probably, some distant farmer's ground. As it happened to be in the winter when I saw it, and after a succession of rainy days, it is possible that this current was wholly occasioned by this fall of rain, but even then it was in the power of the farmer to have secured the whole of this, as well as all that might from time to time pass through these drains, into some large receiver or pond, which would command the land below it. The farmer very quickly saw the capability of the measure; but his interest in the farm was too short and precarious to induce him to set about such improvements, as would too soon perhaps compel him to pay in rent annually, for that which he would have already paid in full.

The borer is not often applied, but I saw an extraordinary effect produced from it very unexpectedly in the parishes of Streatham and Tooting, where, in boring for the purpose of ascertaining the quality and depth of the soil proper for making bricks, in order to calculate its value, about three years since, we hit upon some springs that gushed out with great violence, and continued running for several months, and I believe do so at this time, leaving the ground which was before spongy in places, and on which the rush was found to have taken possession, perfectly dry and firm: the acquisition of this valuable fluid there was of inestimable value, and increased the fee simple thereof in no small degree.

A very large portion of the county to the southward of the hills, having been formerly nearly one entire wood, of which we need no better evidence than that of Cæsar, when he invaded Britain; these, as I have remarked in another place, have from time to time been felled, and the roots stocked up to make way for the plough; wherever these trees, that have been of large dimensions, have stood, the ground having been opened so deep to get out the roots, it becomes so many receivers for rain water, and when over-charged, they act in the manner of springs, and it will, I have no doubt, be found to be more or less the case in many parts of the kingdom.

In the parish of Ockley, and on the estate lately belonging to Captain Sykes, which I surveyed, I saw some particular spots that were full of springs: these I carefully examined, and found the soil loose for five or more feet diameter, and as many in depth; the soil was of a different quality from that which surrounded them, mixed with the chippings, and some entire pieces of the roots of the trees, as black as if they had been burnt, some as hard as ebony, as if petrified, while others that were nearer the surface crumbled in pieces upon exposure to the air. This discovery was presumptive evidence at least of the fact, and accounted for the particular wetness of those places. On all the dry parts of the same estate we found the clay prevail uniformly within 14 or 16 inches of the surface. 'Tis precisely the same all through the parishes of Charlwood, Horley, Burstow, Lingfield, Chiddingfold, Awfold as far as Haslemere; it would therefore be well for the occupiers of such land, either to make holes with a spade as deep as the soil may appear soft and loose, and of a different complexion with the rest, or to apply the *borer*, which by bringing up the various strata, will indicate the true cause of the wetness of all such places, and they may be drained with great ease, although the drains will not keep themselves so clean as if they were springs, and constantly trickling, and therefore ought to be made with greater care and caution, for it is only after continued and heavy rains that these parts at present disgorge their superabundant moisture, and therefore, in dry weather these places will be found by their greater evaporation to be dry also.

Surface waters are, of all others, the easiest got rid of; they seldom are found to penetrate deeper than a few inches, if the land is under aration, and that depth is precisely as low as the plough goes and no farther, for the bottom, by the repeated treading and weight of the plough for ages, and the compressure of the atmosphere, is become so kneaded as to be impervious to rain water. This will appear to be the case in all clayey soils, for sandy and gravelly ones are by nature too porous to admit of being so kneaded without the admixture of a certain portion of argillaceous or calcareous soil. In the instance of these surface waters being got rid of, I hold it to be an indispensable position, that the land is not only ploughed up in the autumn, as soon as the crop is carried, into moderate lands, say four bouts somewhat rounding, the plough being kept perpendicular, that the bottom of the furrow may be cut clean, and as wide as the top which will prevent those ridges that must be left when the plough is held in any angle short of a right one, and every one of these ridges must necessarily prevent the rain water from making its way to the furrows; another condition arises out of what I have said, and that is, that land so subject should be ploughed deeper than land that is more pervious, and much deeper than the roots of corn usually descend, by which means, as they never stand in water, as they always must do in such soils, and under the usual mode of shallow ploughing, they sustain little or no injury, let the quantity of rain water that may fall at any one time, be what it may.

Another advantage to be derived from deep ploughing these strong soils in the autumn, is, that as they are known to be held together only by the quantity of water which they absorb, so they become more forcibly acted upon by every successive frost, than soils of a loose texture. Whatever extraneous particles of dressing may have been previously appli [illegible] the action of the frost more diffusiv [illegible] and more intimately mixed, than [illegible] be effected by the best ploughing a [illegible] that can be given to them at any [illegible] If, therefore, it is a matter of the [illegible] ence to get rid of this surface water [illegible] ds, to prevent the injury that mu [illegible] nsue to the plants, we see, that it is to be effected in the most simple and complete manner possible, by the regular and attentive operation of the plough only; observing always that the water furrows are struck proportionably deeper than the plough has gone on the lands, and whether there be any crop on the ground or not.

That these surface waters ought always to be got rid of with all possible expedition, is a fact that has never been disputed, even by the most unenlightened farmer; but the only reason why it is necessary that it should be done, is, according to their doctrine, because they have found their crops injured by them. They seem in the first place not to consider, that none of the sorts of corn or pulse are aquatics, and, that the more removed the land is from a super-degree of moisture, the more farinaceous and nutritive will be the corn; and the more and longer we retain the moisture in the ground, the greater is the resistance in summer ploughing, and the worse for winter stirring, unless it has been first broke up in autumn.

Thus far the system, we will now take notice of the PRACTICE.

My Lord Middleton has done some draining at his seat at Pepper Harrow, which has been attended with the happiest effects; these drains are made thus and are covered with sods. There have been drainers from Devonshire, and some from Gloucestershire, whom his lordship has employed in this undertaking; the former lay the sod reversed simply over the hole, and without any sort of pressure, throw in the remaining soil, and thus leave it. The latter however, after laying the sod over the hole, with the grass side downwards, ram it well, and make it as firm as possible before they throw the soil in. His lordship's experience convinces him that the latter mode is infinitely the best in his soil, and therefore he follows up the practice.

Some of the farmers at Whitley, adjoining to his lordship, seeing the good effects that have attended his process, have had some inconsiderable quantities done by the same people; but a great deal still remains to be done in that parish; and which would convert much of their bad pasture into the best water meadow.

Mr. Street, of Bramley, has drained at different periods, nearly the whole of his estate, which has evidently improved the fee simple thereof very considerably, and has been the great means of his raising such fine crops of grain and grass. When he first began the undertaking, he thought it so expensive, and being unacquainted with the value of the improvement, he had the work done so superficially, both as to thickness and depth, as to oblige him to have a great deal of it done over again, a circu he has had greatly to lament, since ell done at twice as it might have be e, besides saving perhaps one-third e. One great cause of his failure h moles, (talpæ) which working in his il in great numbers, choke up the v the particles of sand thrown out of it, and the springs not being strong enough to clear away the sand, it accumulates, and ultimately occasions them to blow up.

He now drains with bushes, having as much black and white thorn among them as he can get; but when these materials are not so good as he could wish, he then puts an alder pole at the bottom to keep them open. Some of these drains are between seven and eight feet deep, and the quantity of water that was running from them when I had the pleasure of spending the day with him, was a strong proof of their utility.

The Honourable General Norton has drained some boggy meadows at Wornersh, some with sods inverted, and others with alder poles, but I must confess I did not think the former an eligible mode as to materials, although I do not deny that some.

strata of boggy soils may answer tolerably well, but those I saw were not of that description; the number of drains were too few, and the external ditches of the meadows were neither deep enough, nor of sufficient width; consequently, where the drains emptied themselves into the ditches, it was observed that the bottoms of them were nearly upon a level with the bottom of the ditches, which in course did not draw off the waters quick enough, even on the lowest sides, and therefore, as these meadows have been saturated with rain waters from season to season, they have become swoln in a considerable degree; and it may be depended upon as an undoubted fact, that they will not subside, or sink one inch lower than the depth of the drains are capable of drawing off the water, consequently, a part of the evil only is removed, and the same work must be done over again before it can be effectually done, and the meadows become what they ought to be, perfectly sound. That the draining was incomplete, both as to durability, and as to the purposes for which it was done, was the opinion of my Lord Grantley's bailiff, who accompanied me through them, as well as myself. One cannot but regret, that a gentleman like the honourable general, who is desirous of improving his estate in the most effectual manner, and of becoming a good agriculturalist, should have fallen in with people incompetent to the business they had undertaken, which too often operates as a bar to further experiments, and brings greater discredit on the system, than can well be conceived.

Mr. Iorris Birkbeck thinks his work cannot be done too effectually at first; and therefore, whenever a field stands in need of complete draining, he does no less than 80 rods to the acre, which is a drain at every two rods from each other, and this costs him six-pence per rod for labour only, besides the materials and the carriage of them, which may at from six-pence to nine-pe The materials are seldom more or hedge stuff, but the best of th This perhaps is as much as can be e enant.

But Mr. tchlands, who has had the ass ional gentleman from Luton, ut his work, has found the greatest from draining: it was in an old wood at the back of his house, which he had stocked up in order to extend his quantity of pasture, and to lay his ground more open, giving it at the same time a more ornamental appearance. This land, after being cleared, was so wet and full of springs, that to use his own expressions, a hare would be swamped in attempting to cross it at certain seasons of the year, but since it had been drained, it was become so dry as to admit of a broad-wheeled waggon passing over every part of it, at any season. This vast improvement has been effected generally by one or two drains in the compass of six, ten, or twelve acres, running for the most in one continued longitudinal straight line, at others a little diagonal. These drains are in some places six feet deep, and taken out full 18 inches wide at the bottom, to admit of a large flint stone on each side, and over them large pieces of chalk laid pretty close, and upon these a bundle of furze faggots, which had been stacked several months, and become flattened and pressed close thereby. Upon this furze the soil is thrown, which quickly settles. The course of the drain is about six inches by nine, and they empty themselves into a large or main drain or ditch, made much deeper than the bottom of the drains, and on the lowest side of the ground.

The chalk being buried at so great a distance from frost, &c. is found to stand firm for a great many years; and, unless any extraordinary or uncommon accident happens to it, there is reason to believe that it will be sound at the distance of a century. Every part of the estate that has undergone this operation, exhibits already a new face; and when it has undergone a due course of aration, and put into good heart, we may then say in the language of Ovid, " Fruges olim tellus nunc inarata ferebit;" afterwards laid down with the best seeds into permanent pasture, it will not only be an incalculable advantage to the estate, but, as an embellishment so near the house, an improvement of the most beautiful nature.

Mr. Wm. Saunders, of whom I have so often spoken in the course of this work, has drained a field of six acres in the most perfect manner, having drawn for that purpose no less than 77 waggon loads of large flints, which is at the rate of 13 loads to the acre, and a distance of six miles. His expences were as follows: 8*d.* per rod for digging, 4*d.* per rod for putting in the flints, 1*d.* for covering them with heath, and 3*d.* for filling in the ground, making an expence of 16*d.* per rod for labour, exclusive of stones, heath, carriage, and collecting them, which, upon a moderate calculation, will bring the total expence to between 8 and £9 per acre.

The soil v ochreous clay, full of
springs, and hing would grow but
the rubbish a ch soils. When it was
finished he l deep, and after three
ploughings gs, he sowed it with
Scotch oats, him seven quarters per
acre of fine c up the etch immedi-
ately, and ga inter and spring fallow,
not by letting it lay unmoved, but by stirring it about as often as he could find an opportunity, thereby cleansing and exposing every particle, as near as possible, to the influence of the air; he then dressed it with 30 loads per acre of an extraordinary good mixen of dung and mould, and sowed turnips, which yielded an immense produce, and after folding them off, he sowed barley and seeds; the former was very abundant and full bodied, and there is at this time a fine plant of the latter.

The event of this field (though I do not approve of my friend's plan of taking a crop of oats at the first breaking up the ground, notwithstanding it is the uniform practice) proves the happy remark of that great observer of rural affairs, Virgil, in his IVth Georgic to the old Corycian farmer, " that however bad and ungenial the soil, it may be by attention and skill brought to yield profitable returns at an inconsiderable expence."

My Lord Melville, and some gentlemen at Wimbledon, have had the assistance of the renowned Mr. Elkington in draining their respective estates in that neighbourhood, and they have derived the most essential benefits therefrom. But as there has been nothing in the practice at these places, different from that which has appeared before the public in the various publications on the subject, I have omitted the detail on that account.

ROTATION OF CROPS.

From Kennington turnpike through Croydon to Fellbridge, from the before-mentioned place to the Sussex Oak on Lovet heath, through Reigate, and through Ewell and Dorking, to the 31st mile stone on the Horsham road, (which three places are the boundaries of the county,) the principal part of this vast track of country is employed in aration; such parts of it as are devoted to pasture are noticed in another place, and therefore do not come under our present consideration.

The land to the left from the turnpike aforesaid, extending to the Kent road, and that to the right bearing away to the Thames, and as far forwards as Brixton Causeway Hill on the one road, and to Tooting on the other, being principally confined to nurserymen, gardeners, cowkeepers, and brickmakers, tegether with the scattered residences of the rich traders of London, offers nothing to our notice in an agricultural view; the land is besides too dear for farmers, as such, to occupy. The first farms we meet with after passing the five mile stone, are those of Mr. Wm. Adam at Mount Nod, of Mr. Harrison, near Dulwich, and my Lord Thurlow's, at Knight's Hill; but as the major part of the land which his lordship keeps in his own occupation is in pasture, and there being nothing particular in t ming pursued by Mr. Cole, who, a valuer of farming stock and cro a very good farmer, I shall proceed dam. This farm is the property of th have just mentioned, and here we ble instance of confidence whic place in a landlord, and which ma litable to both parties; but prudence and the daily occurrences of life teach us a very different lesson. It is generally understood that Mr. Adam has no lease, yet with a large family, and the noble Lord having certainly passed the grand climacterick, when life cannot be estimated at many years purchase, still under these circumstances, this gentleman has erected buildings of various descriptions for the conveniences of his family and farm, and in other improvements on the estate, equal in value (if I am rightly informed,) to the fee simple of the estate, at least more than sufficient since I have known it to have purchased it. It may be said, that this has nothing to do with our present subject; as a rare instance, and as a proof that an active mind is not to be stopped in its career after improvement, whatever may be the difficulties opposed to it, and, as without such a spirit, it would have been impossible to have carried on the extensive plans he has since executed; with submission, therefore, I think the observation worth recording, because it would scarcely be credited, that a man without a lease would farm in the most improved manner, under such circumstances as Mr. Adam has done.

Every sort of useful building, every species of apparatus, every kind of implement that can tend to abridge labour, and is likely to expedite business, is to be found at one time or other upon his farm; nor is his attention confined solely to these, for in the articles of stock and grain of all kinds, we find no expence spared to ascertain by experiments which are the most useful and profitable; but after all, I am afraid that these experiments are too warmly taken up, and too rapidly declined to furnish that necessary guide by which alone the best experiments are likely to become useful to society.

The land is in many places wet, in all cold, sour, and hungry, but that great dunghill London supplies him with such inexhaustible resources, besides his own yard, as to make up in some degree for the defects of it, as his crops are for the most part good, often fine; but his system, owing to the before-mentioned reasons, are not sufficiently settled to make the rotation a subject of record. Mr. Adam, as I have elsewhere stated, is partial to lucern, of which he generally grows some acres. He has also tried some physical plants, particularly spear-mint, but I believe with no great success.

At Streatham also is that conspicuous cultivator of the soil Mr. George Adam, whose attention, however, being mostly engrossed in the cultivation of potatoes, (which is noticed under that article,) observes no particular rotation with respect to his corn crops, because he considers them only secondary to oth

Beyond ss the newly erected premises of Esq. who, if we may judge from or arrangement of his farm yard an buildings, the vast extent of his mi immense undertakings he is engaged , with views, no doubt, to pleasure gentleman farmer, we should augur y indeed; for such an exhibition has rarely been seen on this side of the metropolis; but the whole is too much in its infancy to judge of his system.

The same may be said of his brother, who is in possession of the farm formerly occupied by Mr. Blunsum, and has begun his operations by taking in the large tract of waste adjoining to him, which he has broken up and sown with turnips; and like his brother bids fair to farm with spirit.

Mr. Farley, whose farm runs along the road to Broad Green, has many years been conspicuous for his skill and attention to the science, according to the best practices of the old school. His course being fallow with dung for wheat, then peas or beans, oats, fallow with dung for turnips, fed off, barley and seeds, with wheat upon the lay; then tares fed off principally, beans, rye, upon once ploughing for seed, fallow with dung for turnips fed off, barley with clover, or rye grass for two or three years.

From thence through Croydon, and to the right and left of it, we find the property so often changing hands, as to allow us no opportunity of appreciating either their value or their system.

After passing through Croydon, we have the downs entirely before us to the right and the left, and the greater part under the plough, although the soil is generally thin upon a chalk stone, and very flinty, yet, from the number of sheep that are kept by the farmers, the crops in moderate seasons may be said, under all circumstances, to be good; the greater part of the land after you pass the road that leads to Reigate and Merstham, and to Godstone, is inclosed, except a small portion about the 13th mile stone on Riddlesdown, which extends to Warlingham common, on the road to Limpsfield and Westerham.

The rotation, with some little variation of particular Farmers, is as follows:

1. Fallow with three or more ploughings and harrowings, and folded before it is landed up for wheat.
2. Oats upon one ploughing, sometimes after two, harrowed in.
3. Peas upon one ploughing broadcast.
4. Fallow for turnips, the land previously dunged.
5. Barley with seeds, either clover, trefoil, or clover, and rye grass.
6. Clover first cut green, second cut for seed; or first fed off, and part cut, and second for seed.

out of Suffolk in 1803, and bought the lease of a large farm, belonging to the late Sir George Shuckburgh Evelyn, Bart. in the parish of Godstone. The conversation I have had with him, and the practices which I have seen upon the farm since he has had it, prove him to be possessed of considerable practical agricultural skill and knowledge; he is
ainted with the routine of this coun
ith the use of lime; he condemns th
ighing, the weight and the form of
ie snap) of his present neighbourho
onished to see the farmers ploughi
or four strong horses and a driver
id no quicker than he does with tw
, and without a driver. I have examined a great deal of the work while it was about at different times, and, before I was acquainted with him, and I was much gratified with what I saw. One practice I greatly commend, which is, ploughing up the etches and grattens as soon as he has got in his wheat season, which he finishes as early as possible; because, to use his own language, such heavy soil cannot be too soon exposed, and too often stirred to make good seasons of it.

He has been under-draining some of the wettest parts, and intends to go through the whole of his farm wherever it may want, and he does it very effectually; he intends also to deepen and to widen all his ditches, that the surface waters may drain into them; he is trying to flood some of his low grounds, by collecting the torrents of waters that occasionally used to pass along side his land, depositing all the sediment which they might contain in a bye lane, tending thereby to make that impassable which at no time is very good. Having capital judgment and activity, there is no doubt, I think, of his improving the estate; and the estate, as it ought to do, amply repaying him in its turn.

In the heavy parts of Horne, Burstow, and Horley, four bout ridges almost invariably prevail; here the rotation is very short and different, and lime the constant dressing.

1. Fallow for wheat, dressed with lime.
2. Beans.
3. Oats.
4. Fallow again for wheat, with yard dung at times, or in part so.

Few or no turnips are grown, less barley, and but little clover, which is sometimes harrowed in on wheat, or with oats; tares are sometimes substituted for beans, and so are peas.

Taking up the Reigate road at Tooting, we pass by the extensive physic grounds, &c. belonging to James Moore, Esq. the contents of which will be found detailed in another place, under the respective articles of physical plants. The first farm we come to is that belonging to Henry Hoare, Esq. in the parish of Mitcham, and is of some considerable extent; the land is strong and holding; but, in the course of my frequent observations on the state of the husbandry pursued thereon, I never saw any thing to commend. Were I to pass my opinion on the cause, it would be something like this, that the master, unless he takes great pride in seeing that the business of his farm is well managed, and in leaving it altogether to the management of a bailiff, unless he be one of those rari aves which we now and then meet with, is not likely to have things conducted in the best style. As a merchant or banker he may have something else to do, besides watching the actions of his servant, and b [illegible] it of the profession, he is at a loss v [illegible] d, when to disapprove, or when to r [illegible] ifferent mode of proceeding; and [illegible] fter paying all charges, brings him s [illegible] han £5 per cent upon his capital, [illegible] elf well satisfied, forgetting, perh [illegible] ent to pay, and a part of that capi [illegible] some future time, that it would be a losing concern.

The land is far from being clean, nor is it well ploughed, nor early enough for soil that is so tenacious; the ditches are choked up at every other time, but when a new hedge and ditch is made, and then it is too contracted; the hedges are besides in bad order for a gentleman farmer; and those mixens which we see by the road side are not made with skill or science.

I should be sorry if what I have just advanced should do the man an injury, because he is an utter stranger to me; I had much rather in detailing his routine, have had a great deal to have commended. The crops are moderately good, certainly not what they might be so near the London dunghills.

As you descend the hill towards Sutton, the land cannot well be worse farmed, it is not only as foul as possible, but the water courses filled up, and the crops of every kind thin and deplorable; if that was the case in 1803, when I had frequent opportunities of noticing them, how much worse they were this year is not difficult to judge; with such management of land the routine is not likely to be much better, and therefore we proceed through Sutton to the downs.

We have had a different sort of country from the last, as different a soil, and a very large portion of the land in common field, which produces, of itself, a different sort of culture. The soil to the left of the road is near the chalk, consequently thin and flinty; that on the right, being principally in the parish of Cheam, is deeper, of a more kindly loam, bordering on silicious. A very large farm on this side was, when I began this survey, in the occupation of Mr. Logan, (and is the property of my friend Mr. Hilbert,) whose spirited system of farming appears, however, to have been conducted upon no settled principle. He grew frequently large crops of corn, which his soil, with moderate attention, enabled him to effect. His neighbour on the other side of the road at Woodmanstow, the late and much lamented William Ashby, on a soil of moderate powers, but attended to with the greatest vigilance, with abilities far above the ordinary level, and with an exertion that could only be equalled by his other capacities, shone conspicuous as a farmer and an honest man. He occupied a large tract of land, which was in general a specimen of neatness and of high cultivation, free from prejudice or ostentation; and had he confined himself to his farms, without branching out into another profession of great fatigue of mind and body, but which he was certainly well qualified to perform, his family had now perhaps called him father, as I should a friend. No small portion of that practical part of husbandry with which I am acquainted, I derive either immediately from himself, or from m he kindly spared me for two year ilities were of no common cast ll as it can be collected from my own and that of his servant Aynscomb, d as faithfully as possible.

Another neighbour, and a good farmer, Mr. ansted, has at different times favour is practice; but, as for some particular reasons he is about to leave his farm, we must not judge from present appearances of what it has been in better times. His skill and capital are equal to a much larger undertaking. From thence to Reigate the soil and the practice is much the same, but, after passing through Wood Hatch gate, the soil becomes progressively stronger until we approach Charlwood common on the right, and on the left to Horley, where it is heavy, flat, and wet, and thus continues on both sides the road to the Sussex oak.

There is nothing very remarkable in the routine of this division, until you approach Mr. William Cluttons', at Hartswood, which has a lodge at the roadside; here is some good farming, and he would, I am persuaded, greatly excel in the profession;

but his attention is very much called off from the constant superintendance of his own concerns, by the management of very extensive estates in distant counties, as an agent and land steward, by which the vigilant eye of the master becomes suspended, and opportunities must occasionally be lost that cannot be recalled. His parish too (Buckland) is unfortunately involved in some violent disputes with the clergyman about the tithes, which has induced him to lay most of his land down to grass, and other farmers are following the same steps, rather than suffer exorbitant demands to be made upon them, beyond what their improvements will warrant. If my information is correct, the clergyman has consulted men not in the habit of appreciating these things, and having paid those people for their opinions, he thinks himself justified in acting up to the full extent of them; not reflecting, perhaps, that the many can better relinquish a part of their advantages, or suffer a small loss, than one can nearly a total deprivation; to say nothing of the enmity that it creates, which so long as he officiates in that parish, be his future conduct what it may, will never be entirely obliterated.

I shall close these remarks with one more observation, before I particularize the routine, by referring to that nice economy which marks the farm in the occupation of Mr. Pryor, called White's Green, in the parish of Charlwood; by a close attention to husbanding his manure, by seizing the most favourable times to get his land in condition to receive his grain, and by losing no fortunate moment to get it in well, he is enabled to supply the defects of a cold, almost inaccessible country, owing to the flatness and wetness of it, and to farm to good profit. Some further accounts of this farm will have been seen under the article timber.

From Mitcham to Sutton the Rotation is as under.

1. Fallow for sed with London muck, chalk, or ng and road scrapings mixed.
2. Oats.
3. Tares cut l in London in bundles, at 8*d.* and e.
4. Turnips, twice ploughed and dunged, s to cowkeepers about London.
5. Beans.
6. Dunged for wheat and sown early in December, if a favourable season, upon two ploughings of the gratten, the seed harrowed in.
7. Garden or Marlborough grey early field peas.
8. Oats, Tartarian or Scotch.
9. Fallow for turnips dunged and fed off.
10. Barley, with rye grass and clover.
11. The clover and grass sometimes mowed for green meat, for the London dray horses.
12. Wheat, or now and then rye on the lay.

This comprises some of their best systems; the dung comes round however so very often, and due attention not being paid to weeding and cleansing, the land becomes very foul thereby.

Beyond Sutton to Reigate.

1. Fallow for wheat dunged.
2. Peas of the boiling sort, or Marlborough grey.
3. Tares sometimes cut green, sometimes for seed, at others folded off.
4. If the tares are left for seed or cut green, then rape sometimes follows, fed off; or fallow and dunged for turnips, folded off.
5. Barley with clover, or trefoil, or rye grass, or clover and rye grass.
6. Seeds mowed for hay, and then left for seed.
7. Ditto folded off, and when the second crop is in blossom ploughed in, or made into hay.
8. Wheat upon the lay.

The following is Mr. Ashby's, varying as occurrences happen.

1. Fallow for wheat when the land is foul or getting so, folded at night.
2. Peas or beans hoed.
3. Fallow for turnips, folded at night, or dunged for turnips, twice hoed and folded off.
4. Barley with seeds.
5. Clover first mowed, next folded.
6. First mowed, next folded.
7. Wheat upon the lay.
8. Tares for a crop.
9. Oats, Poland or Scotch.
10. Rye folded off early.
11. Turnips upon two ploughings folded off.
12. Barley with sainfoin, for six or seven years,

sometimes the second growth is fed off pretty close as it begins to wear out, but the first growths are always made into hay the season before it is broke up; it is well dunged, and after being ploughed, it is made very clean, and if it has not been dunged, the fallow is folded at night for [illegible]

13. Wheat. [illegible]

Note.—His [illegible] sets for lambing, Wiltshire wethers [illegible] and South Downs for all purposes, [illegible] unted to 12 or 1500 sheep; or [illegible]

1. Fallow for [illegible]
2. Tares fed [illegible] and some cut green, immediately [illegible] for
3. Turnips hoed twice and folded off before Christmas, immediately a bastard fallow is made, of two ploughings, and sowed with
4. Bàrley lightly ploughed in with rye grass, and trefoil harrowed in.
5. Rye grass and trefoil early fed off by ewes and lambs, afterwards dunged for
6. Wheat upon the lay.
7. Marlborough grey peas or early beans,
8. Rye for feed, spring folded for
9. Turnips twice hoed and folded off.
10. Barley with clover.
11. Clover for feed and for hay.
12. Ditto for feed and for seed.
13. Late wheat upon the lay.
14. Rape harrowed in, and fed off soon enough for
15. Oats.*

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* Here are fifteen crops in twelve years.

It is to be observed, that although by the latter system he gets three crops of wheat in 13 courses, the land is kept in such good heart by the crops which are introduced and fed off, or folded off, that it is well able to bear it; in fact his crops were the strongest proofs that it was so; it is worthy of remark, that between each white crop a green crop always intervenes, and as they were in general folded off, a quantity of fresh carbonaceous matter was always supplying the place of that which was extracted by the exhaustion of the white crop. The land was besides kept clean by the several hoeing crops, and we see by this system that there is only one entire fallow during the whole process: for as he said, let beans follow the oats upon two ploughings, either rape, rye, or tares, to be sown upon one ploughing, and so on, it was possible to keep the land always in crop, and always in heart, and without ever getting foul. He was besides uncommonly particular in every sort of seed that he sowed, and by varying the nature of the crop, the land in the language of the farmer does not get tired with the sameness. If, as it sometimes happened by a crop failing from an untoward season, or from any extraordinary circumstance of weather or what not, he lost his season for a particular crop, his genius supplied him with ample resources, without breaking in upon his system; and after having run the changes, mutatis mutandis, he closed it with sainfoin in the best possible state and condition, not because it would not carry the process further, (as it would by substituting buckwheat for rye, rape or tares, spring wheat, or winter barley,) but because he always chose to have a certain number of acres under sainfoin, which he considered one of the most profitable articles he could grow; and rather than be without something near the quantity, he would shorten his course of crops to obtain a fresh supply.

igate.

1. Fallow for ged, hoed, and folded off.
2. **Beans.**
3. **Oats** with s
4. **Seeds** fed
5. **Wheat** upon
6. Tares.
7. Oats.
8. Fallow for turnips.

But where they are confined to three crops and a fallow, the course is altered thus:

1. Fallow for wheat, the land limed or dunged.
2. Oats.
3. Beans.
4. Fallow for turnips folded off.
5. Barley, if not too strong and wet soil, and seeds.
6. Mowed for hay and seed.
7. Oats.
8. Fallow for wheat again.

From Morden to Ewell the land is of the same strong quality, both to the right and left, as from

Mitcham to Sutton, with very little exception, and the rotation assimilates also.

At Ewell we enter the new inclosures, which I am happy to greet as a prelude to the same measures being adopted throughout the county. Its agriculture, whatever may be the change in consequence of the lands being reduced to a state of severalty, is at present too much in its infancy to be ascertainable; we must therefore proceed from thence to Dorking, in the course of which we shall pass over a county beautifully diversified by hill and dale, wood, water, and downs, and thickly beset with gentlemen's seats and villas; among the former are Henry Bolton, Esq. of Leatherhead, Wm. Lock, Esq. Norbury Park, —— Dennison, Esq. at Denbighs, Sir Lucas Pepys, bart. Henry Peters, Esq. at Betchworth Castle, &c. I was given to understand, that Mr. Bolton was a good farmer, or rather that he was a spirited agriculturalist, and I had expected that he would have been civilly communicative; but I was disappointed not a little, to find him disposed to give me no information whatever: of the other gentlemen I had opportunities of learning the state of their farms, and their mode of conducting business, by walking over them, and conversing with the neighbouring farmers, and therefore I only troubled the latter gentleman, who behaved with his usual politeness.

A great part of the track of country I have just alluded to, extending also eastward to the Reigate road, and westward after you have ascended the hill, is in common-field; the soil a thin loam, sometimes silicious, generally calcareous, and abounding in flints, and the vales more argillaceous, and all upon strata of chalk or limestone.

The Rotation is simple and very confined, and with few exceptions uniform.

1. Fallow for [illegible] l off, the ground having been du [illegible] the fallow, hoed.
2. Barley wit [illegible] ieat and no seeds.
3 Clover mo [illegible]
4. Wheat on [illegible]
5. Oats.
6. Fallow for [illegible] ged, hoed.
7. Wheat.
8. Peas.
9. Tares fed off.
10. Turnips.

At Betchworth, and about Dorking upon the sandy loams.

1. Fallow for turnips dunged, hoed twice, and folded off.
2. Barley or oats with seeds.
3. Clover once mown, then folded off, never seeded; and about Michaelmas some plough up the lay, and in about a fortnight or three weeks, sow.
4. Wheat harrowed in, bagged, dung the stubble, plough about Christmas, sow.
5. Peas, Marlborough grey, or beans drilled and hoed, plough up gratten, and sow.
6. Winter tares harrowed in, folded off; upon one or two ploughings sow.

7. Turnips twice hoed, folded off.

Note.—The land very subject to the weed called there yellow boys, (chrysanthemum segetum,) as well as to grubs.

After passing through Dorking, the land on both sides of the way progressively, and almost insensibly recedes from the silicious to the strong argillaceous soil, to the extent of the county; and we find precisely the same system pursued as between Reigate and Lovet Heath: such being the case, we return to Dorking, and pass through Shire to Guildford, and we find the rotation at Wooton, Abinger, Shire, &c. exactly alike, though the soil varies from a sand, as at Wooton, to a deep loam, a calcareous loam as at the latter place and Albury to Guildford.

1. Turnips fallowed for and dunged, twice hoed, folded off.
2. Barley and seeds.
3. Clover once mowed, then fed off, immediately ploughed up, and in a month sown with
4. Wheat harrowed in, dunged on the stubble, and sown with
5. Barley again, or
5. Peas grey, hoed, or
5. Tares folded off; then a bastard fallow for
6. Turnips.

I was extremely sorry I had not the good fortune to meet with Mr. Lomax, of Shire, at home, at either of the times I was in that neighbourhood, because it appeared to me from what I saw of his farming, that it was conducted with spirit, though not perhaps in that sort of routine, which modern practices in the best cultivated spots would point out.

Taking up the Guildford road at Leatherhead, and pointing westward, we pass through Fetcham, and Great and Little Bookham, Effingham, Horsley, Clandon, and Meroe, to Guildford. This is a continuation of that ridge of hills which proceeds from Ke shire, and as such the soil is every wh is bottom, more or less thin in its uppe more or less strong in proportion to Almost the whole of this distance w alty, some parishes are however, now ut as my notes were taken before th took place, I shall detail the rotation I found them to vary.

1. Fallow for turnips dunged, hoed seldom more than once, folded off.
2. Barley with seeds.
3. Clover once mowed, then folded, ploughed.
4. Wheat harrowed in.
5. Oats.
6. Fallow for turnips, dunged as before.
7. Wheat.
8. Beans, sometimes peas.
9. Oats.
10. Tares folded off.
11. Turnips upon two ploughings; or,

1. Fallow, and dunged for turnips once, sometimes twice hoed, folded off.
2. Barley and seeds.
3. Clover once mowed, and then folded off.
4. Wheat harrowed in, or
4. Barley without seeds.

5. Winter tares, if the barley is off in time, if not, spring tares folded off.
6. Turnips once hoed, folded off.
7. Barley again, and sainfoin: or
1. Fallow and dung for turnips hoed and folded off.
2. Barley and seeds.
3. Clover mown first, feed the second by the fold.
4. Wheat upon the lay.
5. Oats.
6. Peas, fold the gratten and sow.
7. Wheat, as soon as the severe frosty weather is gone by, sprinkle a light coat of dung not quite rotten, but such as is entering into the putrescent state, and let it be very evenly distributed, and not in lumps.
8. Rye or tares folded off, sown upon one ploughing.
9. Barley.
10. Fallow for turnips as before.

Resuming the county at Wandsworth, we pass by Richmond park in our way to Guildford. In this park his Majesty, with a solicitude that so peculiarly marks his reign, and in order to diffuse, or become instrumental in increasing the national stock of sustenance, ordered about 230 acres of it to be broke up, and brought into a state of aration. This was begun very shortly after the death of the late ranger, the Earl of Bute; and like every other place when it is first broke up, yielded good crops, especially oats, but being a thin, hungry gravelly soil, many parts of it springy and poachy in the winter, which were laid as dry as possible, yet either from a defect in the system, the want of manure, which could only be got at a great expence, the continued inroads of the deer either by leaping the fences or breaking them down, it was thought advisable to lay it down as fast as it could be ready into permanent pasture, and I was informed that the intention is to bring it all into grass. This being the case, the rotation th ursued is not material to our present he superintendance of this farm was Smart, his Majesty's steward at Wi e bailiff is Mr. Smith, who resides at ortlake, which will be noticed hereaf

From thence rough Kingston, where nothing deserv d until we reach Esher, where lived the Ducket, and where a part of his family still reside, for he, alas, is gone "to that bourn from whence no traveller returns." It is somewhat remarkable that in our former Report of this county, application was made to this gentleman to favour us with such information as related to his neighbourhood, as to its cultivation, and more particularly respecting his management of house lambs, for which he was so celebrated; the only answer we obtained from him was that he had already given it. When I called there in the early part of this survey in my way to Oatlands, not then finding the present Mr. Ducket at home, I took the liberty of sending him some queries, which I begged of him to answer, but from that day to this none have I ever received; common civility is due to every man, or else we let ourselves down below the brute creation. If there had been any thing improper in the request, or any secrets in his profession, which he could not consistently reveal; there must have been some of the queries that could not be so circumstanced, and those he might have answered, or told me that it was not convenient to him; he has perhaps forgot that in order to accommodate his family in trying their several ploughs before a committee of the Arts and Sciences, my father and myself put ourselves to some inconvenience to accommodate them with land for those trials. I have therefore to regret that I must pass by this farm without being able to furnish in detail the practices of so celebrated an agriculturalist, for the rest of the parish will not bear any comparison with it. Such, however, as it is, I shall state it, with the rest of this division of the county. The land about here is in general a fine sandy loam, fit almost for any purpose, it is every where rather too light than heavy.

From thence we pass by Cobham, where Mr. Page, of Pointers, and Mr. Wyatt, of Cobham Court, farm tolerably largely; from thence to Ripley is but little good farming, none on the north side of the road towards the Thames, a great part of which has been recently inclosed, and what little there is on the south side of the heath, has been taken notice of in the other road.

Approaching Ripley we skirt my Lord King's at Ockham, a part only of whose farm I was able to see from the incessant wetness of the weather, and his lordship being then, as I understood, in Devonshire. His lordship is, I understand, fond of the science, and having a genial soil to work on, it is to be hoped that he will prove a Duke of Bedford for Surrey.

At Send I again recognize my friend Mr. Drewett, whose skill I have before noticed, and to whom I am indebted for much of the minutiæ of this part of the county; between him and Mr. George Smallpiece I can make my entry into Guildford with no small s [illegible] myself.

The followi [illegible] r the system of this division:

1. Fallow witl [illegible] ips, twice hoed, folded off.
2. Barley and [illegible]
3. Clover mow [illegible] lded off.
4. Wheat upo [illegible]
5. Oats.
6. Peas drilled.
7. Tares folded off.
8. Bastard fallow for wheat: and

1. Tares folded off for, or rye folded off.
2. Wheat.
3. Peas drilled, early sort, plough up the gratten as soon as they are carried, and during the frost carry out dung upon the fallow; harrowed well about as soon as the weather will permit, shallow plough it, then harrow it well, and land it up for
4. Barley and seeds.
5. Clover mown and afterwards folded.
6. Wheat upon the lay.
7. Tares or rye folded, sometimes for seed, which, if the former, will vary the routine.
8. Peas drilled.

9. Spring fallow for turnips, dunged, twice hoed and folded.

Note.—The farmers about Send are of opinion, that tares do not come off soon enough for their turnip season; but query, is not that more owing to their not sowing their winter tares forward enough in the preceding autumn? I think it is, because on the downs, as well as in the levels, I have frequently seen fine turnips after spring fed tares; but probably, it may arise also from not beginning to fold off the tares soon enough, which is often the case, and brought my neighbour into much difficulty in 1803, besides spoiling more than half his crop, which his sheep would not eat after they had trampled it under their feet. Again, tares they allege make their light lands foul; my answer is, let the land be perfectly clean, and the tares be made pure and free from seeds of weeds, and I will venture to pronounce, that tares will make no land whatever foul. We sow the seed, the tares themselves cannot be transformed into docks, thistles, May-weed, or yellow boys: first clean the land well, sow clean seed soon enough in the autumn to become bold and strong against the winter, begin to feed them off early enough in the spring, not when the blossom has begun to drop off, but just as they are coming into blossom, and I predict that all these objections will be removed.

Again, near Guildford:

1. Fallow and dung for wheat, the etch ploughed up, and sown immediately with
2. Rye for sheep feed folded off.

3. Turnips upon the fold, twice hoed, folded off.
4. Barley and seeds.
5. Clover mown or fed, and seeded as may happen.
6. Wheat upon the lay.

It is a rule to fallow for wheat upon the stronger soils in that ne in course to manure for it; as also frequently for turnips. On the lighter re the land is apt to get foul (pardon m ad terms in the mouths of good farmer stem is used, otherwise every thing is s t.

We next p ly, bearing a little to the east thro Bramley to Awfold, and we pass my ley's at Wornersh, who I have reason to hope upon the return of peace, and when his attention is not called off to the important duties of a soldier, will lay by the sword, and take by the hand that more useful instrument the plough; for his lordship has in reality much up hill, (and down hill too) work to do. On the right of the road we leave the residence of Mr. Street, whose lands on that side are silicious, and on the opposite side argillaceous, and passing by Mr. Barrett's, another good agriculturalist, the soil increases in strength and tenacity to the end of the county.

The rotation is thus performed:

1. Fallow and dung for wheat.
2. Winter barley, the weather being favourable after Christmas, when it has begun to shoot, it is folded

off by sheep, and not unusually a second time without any apparent injury, and the produce will be at least four quarters per acre.

3. Peas drilled, (were formerly dibbled) hoed often twice.
4. Oats.
5. Spring fallow for turnips dunged, twice hoed, folded off.
6. Spring barley and seeds.
7. Clover or seeds mown, and then folded off.
8. Wheat upon the lay.

Note.—On the sharp sands of Wornersh and Bramley, tares are not thought to answer. I think they do not (with submission I say it) understand the plant, when they make such an assertion; since on equally sharp sands, at Woburn, Bow Brickhill, and Wavendon in Bucks, and about Reigate, I have seen it flourish to admiration: or on the stiffer soils,

1. Fallow for wheat dunged.
2. Beans drilled.
3. Oats.
4. Tares, winter, fed off.
5. Rape fed off.
6. Spring fallow for turnips hoed, folded off.
7. Barley and rye-grass for early feed.
8. Rye-grass folded off, then stand for seed.
9. Fallow for wheat.

From Guilford through Godalming to Haslemere.

1. Fallow for wheat dunged.
2. Rye for sheep feed folded off.

3. Turnips twice hoed, folded off.
4. Barley, seeds.
5. Once mowed, and folded off.
6. Wheat upon the lay.
7. Peas or beans drilled, hand-hoed the intervals.
8. Oats.
9. Tares folded off.
10. Wheat so [illegible] led, drawing the drills with a plou [illegible] adcast, harrowed-in.

[illegible]aslemere.

1. Fallow for [illegible] ged, once hoed, folded off.
2. Barley and [illegible]
3. Mowed, and [illegible] or seed.
4. Latter wheat upon the lay.
5. Oats, Scotch or Tartarian.
6. Peas, common hog sort.
7. Dung for Barley.
8. Tares folded off.
9. Wheat.

From Guildford to Farnham.

1. Fallow for wheat, dunged, sometimes folded.
2. Beans, sometimes drilled if the land is free from flints.
3. Oats, sometimes Poland, at others the potatoe oat, when it is to be had reasonable.
4. Rye or rape folded off.
5. Turnips twice hoed and folded off.
6. Barley and clover, sometimes trefoil, or rye grass by way of change.

7. Once mowed, then fed, sometimes left for seed.
8. Tares folded off.
9. Wheat.

From Farnham to Bagshot, Egham and Staines, there is a great part of it uncultivated; and such as is in a state of aration, is in so moderate a style of agriculture, as to be scarcely worth recording; but as we approach Chertsey, the cultivation and the crops improve, and we begin to see a little more of the light of science; from thence to Kingston through Weybridge and Walton, we pass through the property lately adjudged to his Royal Highness the Duke of York, and which adjoins that celebrated place Oatlands, and the residence of their Royal Highnesses. A part of the park was a few years since broken up and farmed, but being no way calculated for it, it has rather afforded amusement than added any advantage to the stock of scientific knowledge; what the new inclosures may do, I am not prepared to say, a few years will be sufficient to decide that point.

From thence we proceed by Abbs Court to Ditton, and then join the high London road to Kingston; in this short distance the land is farmed mostly by a sort of farming gardeners, who pursue no established routine, but are entirely guided by circumstances.

The Rotation will therefore comprise only a short distance, and is as follows:

1. Fallow and dung for wheat.
2. Oats.

3. Grey peas, or horse beans.
4. Rye folded off.
5. Turnips folded off.
6. Barley and seeds.
7. Clover mowed sometimes twice, at other times left for seed.
8. Wheat upon the lay; or,
1. Fallow fo[illegible] d.
2. Oats.
3. Beans.
4. Fallow in [illegible] nips, dunged and folded off.
5. Wheat, w[illegible]

From Ki[illegible] Richmond, Kew, Mortlake, Putney [illegible] turnpike, there are not perhaps half a dozen farmers, exclusively so called, (and who do not mix some sort of garden produce among their farming crops) in all this distance. Their system, therefore, can be of no advantage to agriculture, because it is only in such situations, and under similar circumstances, that it could be pursued.

ADDENDA.

DESCRIPTION OF THE KING'S FARMERY AT MORTLAKE.

The farm yard extends from east to west about 53 yards, and from north to south about 50, forming nearly a square.

On the south side abutting on the high road, is a waggon lodge, an open stable for working oxen, two stables for cart horses, and a chaff house or work shop.

On the east side is an etch barn, a passage or waggon way into the rick yard, a double floor barn, the one end for wheat, the other for oats.

On the north side are piggeries, which extend along the gable end of the oat barn. These piggeries are in two ranges, having a foot way of four feet wide between each range; those against the barn are 38 feet long, and divided into six styes of nearly equal width; the depth of these, including their yard, is about 15 feet, each stye is roofed with plain tiles, and is intended for the younger stock.

Those on the opposite or most northern side, are 45 feet long, there being a door-way taken out of the total length of the other range. This length is divided into five large styes for fatting hogs, and are 20 feet deep. All the styes, their yards, and the foot way, are paved with bricks on edge.

To the west of the piggery are two ox lodges for fatting beasts, with a house in the centre of them to hold their provender, and to be used occasionally as a fatting house. Each lodge is about 36 feet long by 12 feet deep, and is furnished with a square trough, having a hanging lid to hold water, which is conveyed from the one to the other by pipes, from a large trough or cistern in the yard, which is filled from a pump at the north west corner of the yard. There is also a square trough of the same dimensions, to each stall, to hold their food, which is usually barley meal; and their hay is put into its place from a platform at the head of the animal.

These two houses or lodges will fatten about 20 oxen, each water trough serving two stalls; and when the oxen are supposed to have drunk sufficiently, the lids are shut down. This range is separated by a high fence from the farm yard.

On the west [illegible] poultry houses, and a low building f[illegible]ariety of small articles not in constan[illegible] one corner of it the pump is placed[illegible]

At the bac[illegible]s, that is, on the east side, is the ric[illegible]ed by a high close pale fence. Withi[illegible]staddles or rick frames, of nine stone [illegible]; two timber granaries, about 15 feet square, on nine stone pillars each; and a straw house.

In this yard, on the 29th November, 1804, there were, two barley ricks, four oat ditto, one wheat ditto, two clover ditto, one meadow hay ditto; besides carts, ploughs of various sorts, harrows, drills, and a moveable ladder for stacking corn or hay; none of them under cover, and apparently deserted.

The yard is level, the old dung is thrown into a longitudinal heap on one side of it, and the rest of the yard is occupied with the fresh litter, with cribs moved about it.

The stock in fattening were two large oxen, and one lesser of a coarse breed of Hereford, the working oxen were of the Sussex breed.

The hogs were of the small Berkshire breed, with a very savage mongrel boar in the rick yard.

I saw no sheep.

I was much disappointed at the whole. I have seen every part of the business better and more cheaply conducted.

——"Non omnia possumus omnes."

DESCRIPTION OF THE FARM BUILDINGS, ETC. AT NORBURY FARM, THE SEAT OF WM COLES, ESQ.

The farm yard forms three sides of a square; the fourth side, or south west, being occupied by the farm house part of the way, and from thence takes a sweep to the poultry houses on the north west side.

From the farm house, and along the south east side, is a range of cow houses, ox stalls, calf pens, stables, and finished at the extreme, or east end, with the wheat barn, all under one roof.

The divisions in the cow houses are four in number, each holding four cows, 15 feet deep by 28 feet wide, raised above the level of the ground, with a passage at their heads of four feet wide, where they are fed; there are also four calf pens. There is a door from each of these divisions into the farm yard, which is divided off, at the end of these four divisions, for the cows to range in undisturbed by the horses.

Beyond this division is the stabling for the farming horses, which also stand head to head, having a four feet passage between each, from whence they are fed. Parallel with the front, and for the whole extent of this range of cow lodges and cart-horse stables, is a passage four feet wide and parallel therewith; on the right are places for hay, corn, chaff, harness, grains, or what not, properly divided off and locked up, so that each horse and cow-keeper has his own allowance to himself, without having an opportunity of saying that his partner, having consumed his own stock or allowance, had aft [illegible] n some of his. Over this building [illegible] ry and hay and straw lofts, the key [illegible] ept by the bailiff, who delivers out, or [illegible] by measure and weight, the respective [illegible] each keeper, which is thrown or let [illegible] ch lock-up place, with extreme ease, [illegible] the possibility of the proper person's [illegible] ved of any part thereof. The wheat barn is — feet long by 40 feet deep, with two bays.

The end nearest the house is composed of, first, a tool house; second, a slaughter house; and third, a fatting house for poultry, which occupy the same depth that the wheat barn does.

The north-east side is composed wholly of piggeries, with an opening, as passage, in the centre: the division next the wheat barn consists of eight styes of 10 feet each by 16 feet deep, the yard and the stye being of the same dimensions, viz. eight feet each; the other division contains 10 styes of eight feet each, by the same depth as the first division; the styes of each division form one roof, and are tiled.

On the north-west is a two-floor timber and tiled barn; an open barn to receive corn or hay, supported by three columns or posts, with three poultry houses at the gable end.

The yard is divided into three parts, posts and rails, (having a pump in the centre,) in order that the dry cows and oxen may be kept from the milch cows, and the latter from the horses. At the back of the etch barn is the cart lodge, 40 feet long, by 12 feet deep, stretching north west and south east, in the front of which, but at some distance, is the pond; the cart lodge is joined at one end to the east end of the open barn by a fence, and to another fence or paling by the gable end of the said lodge, which latter fence incloses and surrounds all the yard and buildings. The rick yard extends from the cart lodge on the north west side to the garden, at the back of the wheat barn: the pale fence is then continued along the garden, incloses an orchard, and small pleasure garden in front of the farm house, the pond before-mentioned, and joins the fence again at the cart lodge.

The staddles are placed two or four at the gable end of each barn, having sufficient room between each tier for the free admission of loaded waggons. When the corn is to be taken from these staddles into the barn, one or more waggons are placed along side the rick, the lower door of the barn for there are three to the end of each barn, of sufficient height and width to admit the corn being thrown in without difficulty, is opened, and the corn is thrown off the rick into the waggon which may be along side of it, and if that is too far to be thrown from thence into the barn, it is tossed into a second or a third, while a man stationed in each waggon throws it from the one to the other, and lastly into the barn. When the people in the barn have so disposed of the corn as to fill the lower tier, the bottom door is shut, and the second or middle door is opened; and when it is filled up to that point, the upper door is opened, by which means the barn is filled with greater facility and dispatch than it possibly can be by the usual method. Whatever seed sheds or scatters, for the most pa he waggons, so that generally speaki eldom lost or wasted.

When the farn l, which it will be in a very few years, premises will amply repay any perso nt and taste, for the trouble and exp g to see them. He will find the g nder the best system, with the greatest ny place with which I am acquainted. The only thing wanting to complete his plan is the threshing machine, which he intends to erect so soon as he can meet with one reduced to a scale of greater certainty in its various mechanical operations.

ON FARMING BUILDINGS, GATES, &c.

I have been long astonished at the great inattention which seems to pervade almost all descriptions of persons in this, as well as in most other counties in the kingdom, as to the due care and preservation of the farming buildings, gates, &c. upon their several estates. It is a lamentable truth, that upon a large estate, as well as upon a small one, the repairs of farm houses, barns, hovels, sheds, stables, and gates, upon the conclusion of a 21 years lease, generally absorb the first year's rental of such farms, and sometimes a great deal more; whereas, if these same buildings and gates were every seven years coated with paint, coal tar, or pitch and tar, at the proper season of the year, it would be the means of preserving the wood many years longer, would give a degree of neatness to the place, besides administering to the comforts of the respective tenants. Let any one, for example, try the experiment on two gates, both made at the same time, of the same quality of materials, and as nearly of equal weight as possible: let the one be painted and the other not; let their exact weights be taken at the time of their being hung, their situation and use being as nearly alike as possible; let each gate be weighed that day twelvemonths, and it will be found that the painted one has gained but a very small increase, while the other will have increased one sixth; in proportion as the paint wears off, it begins to be more or less saturated with humidity, and although the proportion may be but small in comparison with that which may not have been painted, yet, if it was not to be painted again, it would, when the paint was entirely worn off, be in the same state, or nearly so, with the other gate, whose pores began to open by the sun and air as soon as it was put up, and would be in a fit condition to receive the rain and the dews to swell the wood and increase its weight. The consequence of this extension of weight is, that, if the posts were only strong enough in the first instance to carry the original weight, as that weight increases, the hanging post which is always made the stoutest, becomes forced out of its perpendicular position, the gate is

thrown off its poise, the hinges, the nails, the hooks, &c. are drawn out more or less, and every mortice is strained; the gate then swags and warps, and decay is the natural consequence, both as it respects the gate and the post. The custom therefore is to make a common field gate hanging post of twice the dimensions that it need be, if the
gates were reg , and this additional
waste of timbe any cases, at the pre-
sent increasing t article, be equal to
half, or perh the expence of the
paint. But as of painting, it is not
necessary that should be so heavy,
smaller scantli e sufficient, and the
savings in the ould pay for the first
painting, and the increased durability of the posts and gates, would more than compensate every succeeding painting. But it is to be observed that the wood should be planed, and the edges rounded. I know it will be said, that in most cases, as upon large estates, we grow the timber, while we must buy the paint, to which I answer, that although we do grow it, it ought to receive as much credit in the steward's accounts, as if it had been sold and the value received. In the case of the barns and stables, the paint or the tar is of incalculable advantage to them; the buildings not only retain their primitive lightness, but they are preserved from the inroads of millions of insects and animalculæ, consequently the wood lasts the longer for it, the corn is kept the sweeter, and the cattle preserved in a degree of health, which cannot be the case where cobwebs, and other receptacles for insects, are suffered to harbour.

Now paint and tar for the outside, and whitewash laid on hot for the inside, are inimical to every insect, consequently, they are not likely to form any nidus, on or about premises so treated; and being deprived of any receptacle or proper lodgment for their eggs or young, the buildings are kept in the most sound state that human nature can devise.

I have said that paint, tar, and whitewash, in buildings occupied by cattle, preserve them in health, especially if accompanied by regular exercise and wholesome food; undoubtedly it is so, not only for the reasons before assigned, but for others which I shall else enumerate. It is a known fact, that most diseases attending horses, cows, oxen, and sheep, owe their origin to insects of one species or another, such are those which inhabit the rectum of the horse, the frontal sinus of sheep, goats, and the larynx of stags, according to Vallisneri and Reanmur. These eminent naturalists were clearly of opinion, that they owe their origin to external causes, probably some taken in with their food, and others by various adventitious means; whichever way they are received into the body it cannot be doubted, but they are either accumulated or nearly precluded, as these internal states of the buildings are kept more or less clean and wholesome.

Perhaps they are brought in with their food, as I have great reason to believe that many animalculæ are, and indeed we have the strong authority of the learned and justly celebrated Abbè Spallanzani for so saying, who, to prove the fact, provided a certain number of vessels: in each he put an in-

fusion of vegetable seeds, and then sealed them hermetically. "They were made, expressly for the purpose, large, and each might contain 14 or 15 pounds of water (of 12 ounces to the pound.) It was not necessary to break the vessels for examining the infusions, but sufficient to cause the included liquid to flow to a dry part of the vessel,
and, after it l k, to observe the part
that had been powerful magnifier.
The glass was t, that animalculæ, if
any were prodi seen swimming in the
thin pellicle a e internal surface of
the vase.

" My experi ade towards the end of
spring, and it g before animalculæ
began to inhabit and inhabit the whole.
The periods of their increase, diminution, and destruction, were the same as in the open air.

" On repeating the same experiment often with different seeds, all afforded animalculæ.*"

From proof like this, have we not the strongest and most powerful incentives, not only to keep our buildings clean and sweet, but to be more than usually nice in the winnowing and cleansing of our corn, and the due preparation of our hay, since it is also a certain fact, that insects once admitted into the body, will propagate their species there, and convey them in the seminal fluid to their offspring? For the same author assures us, and it is confirmed by Buffon, Vallisneri, and Bono, that they pass from one generation to another, with the nutriment the mother affords in the uterus, or with the milk that is imbibed. And that the semen of the female is full of vermiculi, perfectly like that of the male. They have been even seen in the blood still warm of a suckling calf, and several among the red globules in the blood of a ram.

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* See Spallanzani. Vol. II. 69 and 70.

The same has been said of saliva, and it is natural to suppose it will happen with other animal fluids.

From these facts, we may conclude, that there exists in us, and in other animals, a wonderful multitude of living beings, and many larger vermes, of which the eminent Redi has given a history in a work on the subject.* The more pains, therefore, we take to keep every thing clean and sweet about us, the freer incontestibly will be those animals which are appropriated for our use, and destined to inhabit them, from insects of all kinds, and the longer will the buildings last.

How far will those depart from real knowledge, who call the possibility of this resurrection in question, before they endeavour to verify it? Prejudices, whether favourable or unfavourable, for any system, theory, or hypothesis, are in general fatal to observation. When we interrogate nature, we must be divested of all prejudice and passion, which obscures the fair face of truth; and, with an amiable indifference, we ought to judge equally against others as ourselves. If on the contrary, we are possessed with wishes, distrust, and doubts, we shall behold experiments from the side favouring our desire, and not from that adverse to it. Our opinions will be incorrect; and, instead of adding useful facts to reason and philosophy, we shall increase the number of errors. Every one ought to bear in mind the language of Persius on such an occasion:

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* Degli animali viventi, negli animali viventi.

> Scire tuum nihil es sciet alter. Sect. I. v. 27.
>
> ———— Scienc ill reveal'd.

Among the c it the greater part of
the kingdom, t y much prevails this
season 1805, pa light lands. Of this
there are two kinds, the one blows with a pale, red blossom, and has its seeds inclosed in a pod or husk. This plant is very prolific, bearing a great abundance of these pods, each of which contains from 20 to 30 seeds, somewhat larger than turnip seed, quite black without side, but the flour as white as that of wheat.

The other species, or variety of cockle, bears a seed somewhat less than the former, and possesses a very peculiar method of vegetation, being found within the wheat-ear, one side of which has its clevels filled with wheat, the other with the seed of this plant, or something like it. The side most liable to this appearance is that which faces the south.

I do not pretend to account for so extraordinary a phenomenon, unless it be from one of the following causes, that the farina of the cockle, at the time of the two plants being in blossom, becomes dispersed among that of the wheat, on that side nearest it, and thereby produces a sort of surreptitious or equivocal generation. And it is a fact, that it is chiefly among the careless and indolent farmers where this disease is most found, and very seldom among those who pay proper attention to good cultivation in all its parts.

As the extraordinary production of this vegetable seems to be totally different from every other kind of plant, and strongly to argue in favour of the doctrine of equivocal generation, now so universally exploded by the botanists of the Linnæan school, it would prove of the utmost advantage to the science of agriculture, if those who, to the latter study have united the study of botany, would enter into an examination or analysis of the cause of this production.

In my late six weeks' excursion through Hertfordshire, Bedfordshire, Northamptonshire, Warwickshire, and Buckinghamshire, and in my frequent rambles through the several corn fields every day for near a month, I could not but be sensible of its effects; but the corn was too far advanced, and I was, besides, unprovided with the necessary apparatus for investigating the cause with that effect I could have wished. Perhaps some critics may apply the language of Horace to me, for taking up this subject.

> ——— Nugis addere pondus.
>
> ——— Add weight to trifles.

Thus do the multitude judge, and those of the literati who think no deeper than the multitude. But it is not so with the real philosopher and naturalist; with him who has seen how much has been observed by able investigators in the unlimited kingdom of vegetables, who beholds innumerable anomalies and exceptions, and consequently learns how fal[illegible]gical reasoning must be: the recital of [illegible]non will excite his surprise, yet he [illegible] the possibility of the fact, from the [illegible]ther facts apparently no less revolting, [illegible]ther cases have been recorded,) whic[illegible]heless most true. Nor can I see that [illegible]an be trifling, which at all interests [illegible]ng of our country, or which may in the inve[illegible]gation tend to add one clue to the discovery of the phenomenon in question. Who would have believed that it were possible for the resurrection of anguillæ or eels of blighted corn, to take place in grain that had been dry four years? yet, it was proved to be the fact by Baker, in his excellent Treatise on the Eels of Blighted Corn. He made this observation before Mr. Folkes, then President of the Royal Society, and numerous other men of science. But he witnessed a resurrection much more wonderful, which was effected after a much longer time. In 1771, he had some blighted corn which he had got from the celebrated author Needham, in 1744. In his experiments, resurrection succeeded perfectly at the end of 27 years.

If this phenomenon is produced by insects, there is no saying to what extent it may be carried.

and particularly in hot but wet seasons, because, in those seasons these eels are more vivacious. They may be in the corn when sown, and passing through the tubes of the stem, fix their lodgement on that side of the ear which is most exposed to rain and sun, and but little or not at all on the other side. "In confirmation of this supposition, if we examine the colour of a grain of blighted corn that has been kept some time, we shall find it to be like soot; if broken, the internal substance consists of a dry whitish matter, which, examined with the microscope, changes to a mass of long unshaped corpuscula. They are not only excessively dry, but lifeless, and so confused and confounded together, that it is extremely difficult to separate them without rupture.

"If the grain has been some hours infused in water, and the extremity adroitly cut off, without injuring the interior, and then pressed with pincers, a parcel of minute eels are seen passing through the hole, just like a bit of paste drawn into a thread. When dropped into water, they scatter; and, falling to the bottom are extended as so many straight lines, or a little curved, and remain in this position until revival.

"Such variety has occurred in the time for revival, computing from the moment of humefaction, that I have never seen the same thing twice. The anguillæ of some grains were reanimated in three hours or less, and others in four or five. Some required 20 hours or more; and some, complete days. All those of the same grain were not reanimated at once, sometimes two days intervened between the first and the last. The whole do not revive; some are disfigured and lacerated, part are always so; but some apparently entire and unhurt remain motionless. Resurrection is affected by the state of the weather: it is accelerated by heat, and retarded by cold; but here also are irregularities."*

O ER TIMBER.

I have alre uch on these topics in the preceding work, that it may seem indecorous to bject afresh. I would gladly have ac rther I had to say under their respectiv in their proper places; but when I re n after a six weeks tour through the midland counties, I found my work was too far advanced to admit of it, and therefore I had no alternative.

In viewing the woods in every direction, where I thought there was a probability of obtaining any useful information, I readily and without ceremony made my way to the spot; and as bailiffs, woodmen, and carpenters, are in those instances most likely to furnish the intelligence I sought for, I made my court generally to them.

In another part of this work I have endeavoured to impress on the minds of the government of this country, and on those of the landed interest, the alarming prospect of a scarcity of ship timber; and I stated the mode which I had pursued to obtain that information which gave rise to such an opinion, and which enabled me to form some calculations on the probable quantity now growing in England and Wales.

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* Spallanzani.

My tour has unfortunately but too well confirmed those sentiments I have before advanced, for where have I been able to say with Thomson,

> Welcome ye shades? ye bowery thickets hail!
> Ye lofty pines, ye venerable oaks!
> Ye ashes wild, resounding o'er the steep.

Scarcely such a thing is now to be met with; and what adds greatly to the calamity, a great many of those trees whose limbs may have been destroyed by wind, lightning, and other casualties, which are still growing and appear superficially to be sound, are upon examination not so. I am indebted to my Lord Warwick for the first hint, and to the manager of his woods for a confirmation of it. When trees have arrived at a certain age, if the branch is broken off from any of the before-mentioned causes, with some people it is usual to cut the same smooth close to the bole, and then to leave it, while others again leave the accident to nature.

In the first case it is very probable, that a protuberance or lip will be formed at the part so smoothed off, which in time will heal over; but this lip which is properly a saucer, pending the healing over, becomes a lodgement for rain and snow, which insensibly insinuate themselves into the body of the tree, and bring on decay and unsoundness. Of this fact I had evident and numerous proofs, for his lordship had kindly given orders, that I should be made satisfied even by the cutting down some of the trees before my face; but that was by no means necessary, as there had been sufficient felled in the spring which had not been converted, and some with the bark on, which, Mr. Guillard (the manager before alluded to) with as much perspicuity as certainty proved to me, were so injured by [illegible] sawed and chopped at those parts wh[illegible] had been broken off; nor was this p[illegible] to oak, but was proved in some rema[illegible] in beech and elm, of large dimensio[illegible] of small. He has had long and gre[illegible] in timber, having been a buyer and [illegible] part of the kingdom, for the house [illegible] East India ship builder at Blackwall; [illegible] me that the whole of his experience confirms the fact.

In the case of the boughs, or rather limbs, which may be broken off and left in a ragged state, as we usually see them, he is of opinion they are not so liable to injure the body, because the jaggedness thereof will hold but a small portion of water either from snow or rain, and if it is at any distance from the body, say a yard or so, it will be many years before any quantity of humidity will be conveyed to the body, and a still longer period before it can affect the heart.

But it does not follow in the former instance, that because the tree became unsound by having a large limb cut off close to the body and left smooth, that it would have become so, if the directions laid down by Forsyth had been immediately adopted; because, if by any process you can exclude the sun and air, which will infallibly open the pores of the tree, and by the admission of water, whether in the nature of rain or dew, swell and crack the parts, if I say you do that immediately, and the parts so treated heal over without leaving any lip or saucer-like appearance, I cannot conceive it probable, that such a tree will hereafter become unsound in its body, immediately adjoining or near to such a part as has been so treated.

If that should prove to be the case then with the tree so treated, and Forsyth says it is so, how much less likely will that tree be injured or rendered unsound, when, instead of cutting the shattered limb clean off close to the body, you only smooth it at the point where it was shivered, and then carefully apply the plaster? I submit this for further consideration; I am not able to confirm this reasoning by my own experience, nor from any information I have been able to collect among those people with whom I have so lately conversed, (and who all admit the propriety of Guillard's observation on the cause of the unsoundness of timber); but Mr. Guillard maintains, that no external covering or coating of composition will prevent the tree after it has lost its limb and cut smooth, from becoming unsound.

If his opinion should prove to be the fact, what is to be become of the timber in the country, which is every day becoming more and more scarce,* and more and more exposed, and consequently more liable to be injured by storms of wind and light-

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* A very considerable land agent has recently assured me, that he has been setting out for next year's fall, near £30,000 of timber, in one part of the centre of the kingdom.

ning? because many limbs will be torn off close to the body, some at a very short distance, and although many may be left to nature, yet many will be pruned smooth and thus left without plaster, and in either case every one of these trees will sooner or later become unsound. The better way, therefore, would be as soon as such an accident
happens, if th size and not in an or-
namental situat it either then or the
following seas its full value would be
obtained, and ould have no reason to
complain of hi

Of the effec g on timber, I confess
I have had no an what I acquired by
reading; but ay at Warwick, there
were two large elms blown down that stood on the lawn, which were sawed into lengths to be removed with greater facility: the but of one of them having been left on the spot where it fell, I visited it every day for some days successively; viewing one day with more than common attention the smaller end, and counting the rings in its transverse section, I accidentally ran my knife up to the handle into a crack about the middle of the tree, I examined it more closely, and found that it extended not only almost across the tree, but that it was very deep. I ruminated a good deal upon the discovery, and I had a faint recollection of lightning being the probable cause. I shewed my Lord Warwick what I had discovered, which was also new to him, but I was not sufficiently satisfied with my own conjecture, to venture to assign that as a cause; but I have since seen some other instances

where trees, (oaks, and chestnuts) have been struck with lightning, and thrown down, which confirm me in the belief that it must have been the case with this tree.

In addition to what I have above stated, it may not be amiss to refer to what Dr. Darwin has said on the subject.

"The blasts occasioned by lightning are more frequent, I believe, than is usually supposed; as I am informed by those, who purchase extensive woods, that very many trees on being sawed through are found cracked, and much injured by lightning.

"The expansive power of electricity is not only shewn by trees and towers being rent by lightning, but by the sound, which succeeds the passage of it through air; since a vacuum, or nearly a vacuum, in respect to air must previously be made by the presence of the electric fluid; and the sides of this vacuum rushing together, when the stream has passed, occasions the consequent vibrations of the air, which constitute sound, whether in the audible spark of electricity, or the tremendous crash of thunder."

There are two other amazing fine large elms which grew upon an estate belonging to the same noble Lord at Tachbrook, which had very suddenly died, although both of them had been before in the highest possible vigour. To account for this circumstance, it is necessary to enter a little into the detail of the case. Around the spot where they grew, it was in contemplation to make a little nursery for young forest trees, and in preparing the ground, the roots were found to have extended themselves in all directions to a considerable distance; many of these roots were cut off, the ground was afterwards levelled, and a knoll or hillock was raised round each tree two or three feet high, in order to make their appearance correspond with some others; shortly after the trees shewed symptoms of si presently died.

There was causes operating to the destruction o s: the first arose from having unmer roots of these trees at a season of the e sap was in its full meridian; and led profusely, perhaps, never ceased so no more was left in the tree. The from covering the tree so deep. When the roots of a tree that has been planted near the surface, and which have been accustomed to be influenced by sun, air, and moisture, are suddenly covered with a profusion of mould, which entirely exclude them from the two former, at least, if not from all three, a check, and that of a very sudden nature, is given to the tree, which no art can remove other than the displacing of the soil; but, although I am well convinced, that such a body of mould so heaped together would not have directly killed the trees, yet in many cases, my experience has proved to me, that it will very materially injure them, will produce a stagnation, and instead of growing vigorously as before, they will sooner or later fall a victim to it.

Hundreds of instances with wall fruit trees I have seen, were the burying the stem low in the ground by raising up the border with a body of fresh soil; has entirely killed the greater part of them, and the removal of the soil from about them has alone recovered those which are yet alive.

The decay of most of the trees in St. James's park is owing in a great degree to the accumulation of soil from time to time about the roots, and by that means they become farther removed from sun and air.

Trees that have been planted too deep have suffered in like manner. But the phenomenon the most remarkable attending the death of these trees, was, the issuing out from every part of the stem a large body of saccharine matter, which continued to exude or discharge profusely until the trees were dead.

It is evident therefore that it was to the improvident cutting the roots at the season it was performed, and the heaping of the mould, that conjunctly were the causes of the death of these trees. Had no mould been put over the roots it is probable that the sun and air would have formed a sort of cicatrice over the wounds, the sap would have continued to perform its office, though not so regularly as before the operation, and the trees would still have lived. Parvis componere magna solebam. If a thistle is cut down during a hot sunshine, the plant bleeds profusely first, but the sun and air stop the bleeding, and instead of killing it, we know from sad experience, that we increase the number of them; for the plant sends out more numberless offsets, which it would not have done if it had not been cut down at such a time. But cut the thistle down in dull, gloomy, muggy weather, and the plant will bleed to death, because there is nothing to check the bleeding, on the contrary every thing to promote it.

Nor probably would the trees have died if these roots had been cut in the winter; doubtless they would ha [illegible] ked, but I do not think it would have [illegible] eath.

It has been [illegible] by many farmers that wherever the [illegible] es the large horizontal roots of an oak [illegible] ing apart in the field, or where the g [illegible] n ploughed close to the hedge-row, du [illegible] fallowing, if those roots are removed ab [illegible] so rended or torn, and cut smooth, the t [illegible] ot appear afterwards to be sensibly injured. To account for this it may be urged, that it is the tap roots on which the oak depends, and not on these horizontal ones. I then ask for what purpose were they there? Can it be believed that an all-wise Creator should destine these roots to grow there, and that they shall be of none, or of but little, service? Depend upon it, those trees are in all cases the finest for every purpose whatever, whose roots are more horizontal than perpendicular. The reason why the tree did not appear to be sensibly injured, is, because, it was more or less within the influence of sun and air, and would not immediately shew it; but I never yet saw a tree in a corn field where the plough was of necessity obliged occasionally to go, that did not sooner or later fall a victim to the repeated lacerations of its horizontal roots; and so much do these trees, whether apart, or in the hedge-rows, if they have large heads, stand in the way of the farmer, that there is no scheme he can put in practice, secretly, that he will not pursue to get rid of these incumbrances. I should be sorry to charge the whole of so large a body of men, many of whom are above such practices, with acting upon this principle, but it was done upon a large estate near Woburn, both by the present tenant and his predecessor, and we know it is done every day in all parts of the kingdom.

How then can we calculate on the present stock, much less on a succession of timber, while such practices do and are likely to prevail; and shall we go on another century with the same apathy, the same inattention to this vast national concern which has marked the character of the last? Have we no men of sufficient patriotism among our leaders at the helm, to step forward at this time of public calamity, and be the instrument of setting an example worthy of being recorded in the pages of his country, in establishing a depot for the supply of the future navies of England? "He who does not resist the national mischief threatened, says Tully, when he may, appears in as criminal a light as if he had deserted his parents, his friends, and his country."

Mark the language of the following bards, which surely will arouse a spirit and an energy in my countrymen that seem now to sleep:

High on the cliffs the British oak ascends,
Proud to survey the seas her pow'r defends;
Her sov'reign title to the flag she proves,
Scornful of softer India's spicy groves.

FENTON.

Let India boast her plants nor envy we,
The weeping amber, and the balmy tree;
While by our oaks the precious loads are borne,
And realms commanded which those trees adorn.

Pope.

O thou whose artless, freeborn genius charms,
Whose rustic zeal each patriot bosom warms,
Pursue the [illegible] pleasing toil,
Forsake the [illegible] nobler soil;
Extend the [illegible] man kind,
Manure the [illegible] te the mind:
Then plant [illegible] freedom, truth,
And sow th[illegible] n our youth;
Let no ran[illegible] brambles choak,
And shake [illegible] he British oak:
From nort[illegible] the vernal bloom,
And guard [illegible] the wolves of Rome:
On Britain's liberty engraft thy name,
And reap the harvest of immortal fame.

Garrick.

SURREY IRON RAIL WAY.

This subject has already appeared in the first volume of this work; and since that was printed I have had occasion to notice the increasing *traffic* thereon, which has induced me to make further enquiries into the economy of the concern, so far as respects its tendency to increase the national prospect by opening new sources of trade, or by extending that which may have been before carried on.

It will be recollected by those who have read my preceding account of this concern, that I endeavoured to obtain every possible information as to the expence of the undertaking, and a variety of items which alone could enable me to form just conclusions as so the probable advantage or disadvantage to the community; (for to certain persons situate on the direct line there could be no question, although they might never receive any interest for the money advanced), but not meeting with the information I expected, I was obliged to be satisfied with such documents as I could procure, and hence whatever errors I may have fallen into must be placed to its proper account, and the only atonement I can make is by taking the first opportunity to correct them—this therefore I shall endeavour to do by laying before the public some particulars with which I have since been favoured, as follows:

"The iron rail way may be considered a prosperous undertaking, from the traffic on it every day increasing, the revenue being in full proportion to the forwardness of the work, and from the demand for the valuable productions of the Merstham quarries and pits every day gaining ground, and which only required the opportunity of carriage now afforded by railroad to become of general use in the metropolis, as the lime is acknowledged equal to that from Dorking, and the stone applicable to all the purposes of building, &c. To these advantages may be added that of the flints found principally in the line of country through which the road passes, and which have been long considered by far the best article for forming and amending the public roads, and which required only the facility of carriage now afforded, to become generally adopted. An experiment lately made has fully proved that the power of draught on the road is almost without limit, as one horse (not remarkably superior for his strength) drew thirty-seven tons of stone for six miles in less than two hours, and without evincing any symptoms of distress or fatigue; to prove which, for the last half mile of his journey, seventeen additional tons w [illegible] n, making the whole fifty-four tons, [illegible] he proceeded without difficulty.

[illegible] DIARY.

General De [illegible] red me with a copy of his farming d [illegible] h is contained printed heads for most of the principal occurrences on a farm. One of these papers is filled up and sent to him every week, let him be in what part of the kingdom he may. By being in possession of such a document he is acquainted with every day's work in any particular field; the same with respect to the labourers; what stock is bought or sold; with the casualties that may have happened: so that when he returns home, he takes these papers in his hand, and without any further reference to his bailiff, he examines into every thing that has been reported, against which he makes such remarks as he may see necessary, and thus is always ready to meet his bailiff to investigate those remarks.

As I have not met with any thing of the kind in the county, I begged permission of the General to introduce a plan of it in my work, as the utility of some such method cannot be disputed.

Weekly Account of General De Lancey's Farm.

Persons Names.	Horses.	Monday.	Horses.	Tuesday.	Horses.	Wednesday.	Horses.	Thursday.	Horses.	Friday.	Horses.	Saturday.	Wages.	
													Per day.	Per week.

	No.	Weekly Account of Cattle, Corn, &c. &c.	Remains	Amount.		Dr.	General Weekly Account.	Cr.
				Bought.	Sold.			
Cows..								
Calves								
Sheep .								
Lambs								
Hogs .								
Pigs..								

General Remarks.

OBSERVATIONS ON THE PRINCIPLES OF GRANTING BOUNTIES ON THE IMPORTATION OR EXPORTATION OF CORN.

The great question, as to the policy of granting a bounty on the exportation of corn, has employed the pens of se e men, such as Dirom, and Mackie, L and Mr. Malthus, in its support; and f a very judicious pamphlet, entitled on the Impolicy of a Bounty on the of Grain, and on the Principles whi regulate the Commerce of Grain," ag

In the year 17 effield published a pamphlet, attempting to prove the impolicy of granting bounties on importation, in consequence of a bill then about to be brought into parliament.

I look at these questions as they involve the most serious concerns of this kingdom; and, however inferior my abilities may be to the task, I may nevertheless offer my mite for consideration. It is not my intention to go deep into the question, having neither time nor leisure for such an undertaking.

The policy of granting a bounty on importation arises from the circumstance of either a great dearth of corn from bad harvests, or from an increased multiplication of inhabitants, with but moderate harvests, or from a large portion of arable land being laid down to pasture, whereby less corn is necessarily grown. Let us consider these points as they appear.

Whenever a great dearth happens in this country, as in the years 1800 and 1801, from either of these causes, a very great and unexpected advance takes place in the price of that necessary article of life, bread corn. Popular clamour immediately seizes the great body of the lower orders of people, always ripe for such a purpose, and fixes this absolute scarcity on the whole body of large farmers and corn dealers, as the monopolizers of corn, and the cause of this advance in price. The public prints second the outcry, and, by a mode peculiar to themselves, inflame the minds of the people already in a ferment, against the farmer and dealer, until the minister finds it necessary to offer a bounty, with the consent of parliament, for the importation of that corn which sound policy says ought to have been grown at home. But as it is not grown at home, we must import it from abroad to satisfy the wants and necessities of the people. As an inducement for merchants to enter spiritedly into the speculation of importing it from every quarter of the globe, we offer them a bounty, which secures to them at any event a certain price. An idea so repugnant to the principles of commerce, and so fraught with evil to the growers of corn at home, as nothing can justify. Do we offer a bounty for the growth of corn in England to guard against the periods of scarcity? No; but we offer a bounty to the growers of corn on the Continent; we make them the carriers, while we are injuring the growers here, and spending our money among those, who the next minute would assist in cutting our throats. Is it possible to conceive an idea so monstrous, so full of mischief to the community? If our country was so circumstanced that no more corn could be grown in it, the measure might be good policy; but as that is not, thank God, the case, it is the height of madness and folly to pursue the mode of granting bounties to foreigners to feed us at home. Let the experiment be fairly tried by offering the same bounties for the grow n England, and see if it will not produ orn as you can obtain from abroad, in in quality, and with the certainty of g on your enemies for the liberty of ke wn people from starving.

Lord Sheffiel intimated in the paper containing the n of the Committee of Privy Council of 1791, that England must not in future think of supplying herself with corn: and further, that Europe is unable to supply itself when the crop fails in any considerable degree; that therefore, in such a case, we must all look for a supply to America. If this be true, it is the most alarming information that we of this country have ever heard; so alarming, that I cannot conceive that the loss of all we have in Asia and America would be half so fatal, or so much to be apprehended; but I trust, that a dependence on other countries for subsistence, will not, of necessity, be our situation. A perseverance in a bad system of corn laws, discouraging to agriculture, may in time bring about so lamentable a dependence, and such bad systems will, I fear, be fatally established, if the Corn Bill should pass into a law in its present form.

"If it be true, that we are actually in a regular state of dependence on other countries for subsistence, the bill ought, as it seems to me, to have been formed on totally different principles. Instead of a short-sighted and narrow attention to keeping down the price of corn, merely by facilitating its importation, the object of the bill, as I conceive, should rather have been to discourage a dangerous, wasteful, and uncertain dependence, by so effectual an encouragement of tillage, as should not only secure to us, at all times, a supply for ourselves in this island, but also for our dependencies.

"The committee of council imputes the alarming change from an enriching export to a ruinous import of corn, to an increased population, an increased opulence, and consequently an increased consumption; and then adds, that there can be no reason to suppose, either that the agriculture of the country has of late declined, or that for a long continuance of years, the seasons have been unfavourable. It must be obvious to every man, that it is of the utmost consequence to inquire into the cause of this change, in order to enable us to provide an adequate remedy for the mischief.

"I know, from personal experience, during the whole period alluded to, that the supposed greater scarcity of corn than formerly has not arisen from bad seasons; and it seems that there can be little doubt but that the change in question has been occasioned more by an increase of luxury, than by an increase of population; and is owing exceedingly to the inattention of the legislature so to

provide, that the increase of tillage might keep pace with the increase of consumption. Whether tillage has increased within the period of 18 years, or even a longer time, is very doubtful. In some counties, particularly the eastern, and a few of the southern, and also in the poor soils that are within reach of manures at moderate expence,
tillage may ha ; but in the midland
parts of Engl ich soils, much land,
which was forr rn, is now within 30
years become e re. The increased ex-
pences that fall e multitude of excises
that in various st affect the land, the
increase of titl tom of taking in kind,
that mischievo nprovement, naturally
turn many from tillage to pasture, by which they avoid a variety of expences, as well as the discouragement arising from an uncertain price for corn. Even if there were no other reason, the price of meat, butter, cheese, and hay, being allowed to find its proper and natural level at market, and the price of corn being depressed by importation below its natural and proportionate value, this alone is sufficient to divert many from tillage to pasture; and as the prices of the former articles increase, the practice will continue of exchanging arable land for pasture. These circumstances, of themselves, will sufficiently account for the decrease, or at least, for the inadequate advance made in tillage for some years past in this island, compared with the increased consumption of corn. The prodigious increase in the demands for other kinds of corn, besides wheat, in this kingdom, especially of oats,

explains why we have not exported so much corn of late years as formerly; and shews how the extraordinary importation of oats, in particular, is found to have been necessary. Large tracts of land, which might otherwise have produced corn, are now required to grow grass and hay for the multitude of horses kept. Add to this, the luxury of the country is so much greater than it was, that the demand for butter and cheese exceeds, beyond all proportion, that of the former part of this century, which consequently contributes to divert the farmer from tillage; and, although the private brewery is in great measure suppressed among the lower ranks of the people, the public breweries, perhaps, use double the quantity of barley they did.

"The demand of corn for distilleries was some years since comparatively a trifle; and half a century ago, a great proportion of the lower classes of people, who now eat wheaten bread, were content with barley, rye, and oaten bread.

"If these circumstances are thought to account for the change pointed out by the committee of council, it may be proper to inquire:

"First, whether this kingdom is of necessity dependent on other countries for its subsistence, or whether England can raise a sufficiency of corn to supply its own increased and increasing demand.

"Secondly, whether proper means have been used by the legislature to promote a growth of corn equal to the consumption.

"Thirdly, whether the late corn bill provides the best means of rendering the growth of corn in Great Britain, equal to the consumption; or what will do so."

So far the noble lord: he then proceeds to assign some very powerful arguments to prove, that under the present system of corn laws, with the dearness of the price of land, the system of tithe by composition, or by kind, the weight of taxes, the burth or, the increase of inhabitants, and at the spirit of agriculture, so far he growth, is in every instance depress says:

"If the pric ses ever so high, the ports are never ign sugars; but if the value of corn r ing like a considerable price, not only the ports are opened, but importation is encouraged by admitting corn for three months certain from untaxed countries, paying scarcely a nominal duty.

"In the case of other great native commodities, except where a monopoly is given of a raw material to a manufacture, the ports are always open for exportation; and if there is any danger in our own markets from foreign competition, the article is protected by prohibitory, or high duties; and whatever revenue is raised on that article, or paid by those employed in it, can be demanded from the consumer, as always should be the case. But in respect to corn, the moment the price rises to that which cannot afford much encouragement, but barely pay the expence of growing it, the farmer is checked, and, by the opening of the ports, as already described, he is prevented from receiving a just return for his anxious labour and risk of capital."

Again—" We depress agriculture in favour of the Dutch, and other nations; we pay for draining their lands, while many hundred thousands of our acres lay waste; and this will ever be the case, if we do not protect our agriculture, either by an equalizing duty, which should never be lower than 5*s.* per quarter on oats, or by not opening the ports on the low duty until the price is at least 21*s.* which is in proportion to the importation price of other corn on low duties.

" When the ports and immense warehouses of foreign corn are suddenly opened on the farmer, while the price is only moderate, he cannot make himself amends for a damaged or a half crop; he must go to market; corn is of a perishable nature. There can be no combination among the growers of corn in England. The article is in too many hands; we are therefore sure there can be no monopoly of it; the farmer must sell it at 6*s.* per bushel, although, in consequence of bad seasons and bad crops, he is not able to afford it so low. The consequence of this must be, that he will not sow, unless, in case of losing a part of his crop, he can make himself some amends, by selling the remaining part at a better price. But, although there can be no combination among the farmers of Great Britain, there may be monopolies and combinations among those who warehouse foreign corn."

From this chain of reasoning it appears that his lordship was, in 1791, a very staunch friend to an extension of the agriculture of the kingdom, in order to meet the increased and increasing demands for corn, for the supply of the inhabitants of this country, and a decided enemy to the system of bounty on importation, as a means of depressing the agricultural spirit, as well as a source of enriching foreigners. Of the policy of the measure, and in general so far as I am able to appreciate the whole tenor of the pamphlet, it appears to possess principles which are sound, and which cannot be controverted, and breathes the spirit of true patriotism. And had his lordship followed up these ideas and principles in the various stations he has occupied, as a senator and president of the Board of Agriculture, in which he has most certainly had opportunities which cannot be recalled, I for one have no hesitation in saying, that he would have deserved more of his country, than any man since the days of the immortal Chatham. But having thus signalized himself as an author and as a patriot, he was satisfied with the credit he had obtained, and then retired to enjoy his otium cum dignitate. Has he no weight as a legislator, to enforce his doctrine, that every act of bounty on importation is a measure fraught with evil to the landed interest in which they are so materially concerned? Has he not powers of language to convince them that we have the means within ourselves, (and which has since been most amply proved by the Board of Agriculture, from the chair of which the noble lord has so recently retired,) of growing more corn than we can consume, notwithstanding the declaration made by the committee of privy council? Has the noble lord ever made the experiment to ascertain what he could do, either during the calamitous seasons of 1800 and 1801, as well as that of 1804? Did he attempt any bold measure of a general inclosure bill, or recommend any measure during his presidency, by which more land might be brought into tillage without breaking up old inclosures? If the noble lord has not done either of these things, he may be said to have either slept on his post, or to have strongly recommended in his pamphlet, that which he has not ventured to bring forward in his capacity as a legislator?

I mean not the slightest offence to his lordship; but when we read a publication pregnant with facts and arguments for the most part unanswerable, and when we know that the author of such a work has had it in his power, and still retains a part of it, to have carried into effect (or at least to have attempted it,) the principles promulgated in that paper, we cannot but be at a loss to find out what can have been the reason for deserting it. Every good citizen must lament that a subject of which the noble lord was so perfectly master, should have been so long abandoned. It is not too late, and happy shall I be if these pages should ever meet his lordship's eye, if they should have the effect of inducing him to pursue, until he has accomplished, what he himself has recommended.

Let us now consider the effect which a bounty on exportation has had on the interests of the community. We have tried the experiment, and the last most calamitous season (1804) has given us an opportunity of appreciating its policy, whether good or bad. In considering it I shall have frequent occasion to resort to the pamphlet before alluded to in support of my arguments.

We are given to understand by the advocates for a bounty on exportation, that when a superabundance of corn is grown in this country, or in other words, when t
large, and so much more than the
United Kingdom can consume, and
arily depresses the money-price of t
y below what the farmers can grow
rent and taxes, labour, &c. and to rese
rofit for risk; that, in that case it beco
y, or rather expedient, to export so mu
perabundance to countries abroad, as may be the means of bringing the price of it to its fair value. If the crops on the continent are fully equal to the supply of their respective inhabitants, they do not require to import any, unless the price is so much below their own, together with all the charges of freight, insurance, warehousing, and risk of capital, as to induce the more opulent merchants to speculate thereon. If then, we cannot send our corn to those markets, but under all those charges and disadvantages, we cannot send it at all; and we must either keep it at home, or a bounty or premium must be paid to the exporters to compensate this disadvantage, and to enable the growers to export it without the possibility of being losers by the bargain.

If this is the fair question, and I have endeavoured to understand it to the best of my abilities, it has a most evil tendency, which I will endeavour to prove.

"During the reign of enormous prices and high profits," says the author of the pamphlet in question, "it is well known that the ideas of the farmers became too high. They estimated, as was not unnatural, at much more than its proper value, the continuance of the gains they were then making. They were so eager in their business that they became willing to promise any rent for their farms. New leases were in almost all cases granted upon terms proportioned to the price of corn at that time. When the price of corn fell, they found themselves of necessity reduced to distress, having bound themselves in an unwise and unequal contract. But, as is usual with men, they did not blame themselves for the evils which they felt; they blamed the low price to which corn had fallen, and one of the happiest circumstances which could arise to this country, became the object of their clamour and outcry. The farmers had not sufficient profits; they could not carry on their trade; prices must be raised. Of course the landlords liked this cry better than that against unreasonable and ruinous leases. They joined in it; for their interest naturally prevented them from seeing its absurdity. They came to Parliament for assistance to export corn, till the farmers could sell it high enough to pay them their present rents; and, wonderful to tell, Parliament granted that assistance!"

If this position be true, the inference to be drawn from it is, that it was supposed, for it never was attempted to be proved that there was a great superabundance of corn; and therefore, it was necessary to enable the farmers to pay their rents to their landlords, and to meet the merchants on the Continent; to grant a bounty on the exportation.

I say, it was supposed that there was a great superabundance; and the people of this country were made to believe that it was so; or else I am
persuaded, th ture never would have
consented to f a bounty, because it
was proposed l interest, in opposition
to the intere mmunity. If such ideas
were once to set of manufacturers or
merchants mi ck the markets abroad,
with their pa and merchandise, and
not being abl f it afterwards but at a
loss, might, with as good a grace apply to Parliament for such a bounty on the exportation of those articles, as might ensure to them no loss, and yet enable them to find a sale abroad.

It was attempted to be proved that it was superabundance alone that produced the deterioration in the price or value of corn. Subsequent events have but too fully proved the fallacy of the assertion. It was not to superabundance, but to the then state of Europe, and particularly this country, that produced the depreciation in the price of corn. The kingdom was alarmed, every part was armed or arming under the impression of the most dreadful invasion that ever befel a nation. Every merchant, every mechanic, every labourer, nay every peer was in a state of military array and military requisition, and no excuse was admitted from any description of persons.

In such a state of things, was it likely that the great jobbers in corn, the great merchants in corn, the great mealmen, would lock up thousands of quarters in granaries, under such impressions? No, the fact was, the former bought in small quantities merely to carry on a sort of chandler's-shop trade, the merchants bought none, and the millers and mealmen bought but little more than their weekly consumption obliged them; this then, and nothing else was the cause of the lowness of the price of corn, and not superabundance, as was speciously held forth.

Let us look at this nominal superabundance, and see the consequence. The crop of 1803 is admitted to have been good, nay, if you will, large: under a pretence of superabundance you export several thousand quarters of corn, and that raises the price of it in the home market, to the consumer. The crop of 1804 proves very short in England so called, but very large, perhaps greater than ever was known, in Scotland; the surplus produce of 1803, had it been retained in England, in any manner whatever, say by advancing a certain value for it by way of mortgage, as was practised a few years ago to the merchant and manufacturer, would not that corn have paid for being so kept? Should we have run the risk we did of being starved? And if it had not been for the produce of Scotland and the Baltic, should we not have had the quartern loaf at 2*s.* perhaps 3*s.*? Did the export of corn in 1803 amount to one-half, or one-fourth of the quantity that we imported from Scotland and the Continent? If it was not, the bounty was a most impolitic measure? For surely it will not be maintained as a position, or as a policy in a statesman, to grant a bounty on exportation, unless there can be proved to be that sort of superabundance which shall be more than sufficient to supply the inhabitants in the event of a great scarcity the next year, and thereby prevent the possibility [illegible] to foreigners for that supply which [illegible]e without.

The export [illegible], it did raise, the price to the consume[illegible]hat fair grounds, or by what sort of [illegible] right, has one part of the community [illegible] exact from the other a price much gre[illegible] fair market price? If such a thing w[illegible] tolerated, there would be an end to all fair dealing between the different communities, they would be at perpetual war with each other; for the manufacturer would oppose the grower of corn, while the latter would oppose the manufacturer, and this would bring on such a scene of confusion, as is not easily to foresee the consequences. Justiciæ partes sunt non violare alios. Tul.

We will now see how the bounty operates as a principle of population.

The bounty, they say, opens a large market to the farmer; secures to him a reasonable profit; thus encourages him to augment the produce of his land; and so improves agriculture.

"The whole strength of this argument," says the same author, "evidently depends upon the assumption, that without this bounty a sufficient market would not exist for the farmer. It is not enough that he enjoys the monopoly of the home market; it is not enough that you allow him the market of the whole world in a free exportation. You must pay him over and above for carrying his corn to this foreign market. But is this in reality the nature of the farmer's business? It requires the examination only of a single principle, a principle very well understood, and indeed thus far not very difficult to understand, to see that the nature of the farmer's business is altogether different, and is in this respect most remarkably distinguished from all other trades.

"No proposition is better established than this, that the multiplication of the human species is always in proportion to the means of subsistence. No proposition is more incontrovertible than this, that the tendency of the human species to multiply, is much greater than the rapidity with which it seems possible to increase the produce of the earth for their maintenance. No one will, however, hesitate to allow all that is necessary for our argument, that the tendency of the species to multiply is much greater than the rapidity with which there is any chance that the fruits of the earth will be multiplied in Britain, or any other country in Europe. What is the consequence of this great law of society, but that the production of corn creates the market for corn? Raise corn as fast as you please, mouths are producing still faster to eat it. Population is invariably pressing close upon the heels of subsistence; and in whatever quantity food be produced, a demand will always be produced still greater than the supply. The exportation of corn, therefore, is not so very simple a thing as the advocates for the bounty wish to make it appear. By checking population it produces at least one effect, which no wise politician will disregard.

"We see then that the nature of this elementary principle of society, of which we never ought to lose sight, is such, that a sufficient market is always provided at home for all the corn which the land, with the utmost exertions of the farmer, can ever be made to produce; that the demand will always be proportioned to the supply, however great that supply may be; and that a foreign market can never be wanted for any quantity of corn that can be regularly produced. A foreign market can never be necessary, but to take off the surplus of an extraordinary year. To send away any part of the regular produce of the country, however rapidly that produce may be increasing, is just to cut short a proportional part of the natural population of the country. That this ought not to be done, but for very weighty reasons, surely needs no proof.

"The committee of the House of Commons, when they proposed that a law should be made to secure a certain and uniform fair and reasonable price to the farmer, never, I think, could be serious. Why did they not recommend a law to secure to him the certain and uniform number of calves and foals, from the number of cows and mares he employs as breeders? What insures the maker of knives and forks, or of ploughs and spades, a reasonable profit? Why, the market. Is not this sufficient to secure to every trader the profit which belongs to his business? Is it not absolutely necessary, by the very nature of things, that this should do so?

"Mr. Burke has said, that a greater and more ruinous mistake cannot be fallen into, than that the trades of agriculture and of grazing can be conducted upon any other than the common principles of commerce. The balance between consumption and production makes price. The market settles, and alone can settle that price; who are to judge what the profit and advantage ought to be? Certainly no authority on earth. It is a matter of convention, dictated by the reciprocal conveniencies of the parties, and indeed by their reciprocal necessities."

As every species of trade ought to be free and unshackled, either to export or to import, as the several necessities or demands of the individuals of each nation may require (with the exception perhaps, of one or two national articles of commerce) and exempt from all bounty and premium whatever, so it will follow, that in whatever country a superabundance of any particular article may exist, that superabundance will find its way to some other country that may stand in need of it, without requiring any interference whatever on the part of the executive government. So long as any profit attaches to the adventure, there are an abundance of people ready to embark in it, let the extent of the capital required be what it may. Whenever corn is dearer abroad than what it is at home, it will be sent thither; whenever it is dearer at home than it is abroad, it will be brought hither;

it needs no bounty either way, it only wants to be properly considered, and the result will be favourable to the country. Highly, however, as I love agriculture, have much respect for the landed interest, and entertain a good opinion of the tenantry, yet I cannot acquiesce in the principle of bounties, because I think them prejudicial and inimical to the rest of the co The law of nature does not only allow us to defend ourselves. It is our duty no selves, but to *society*. "Vitam tibi ipsi is negas," says Seneca. If we tamely su upon our freedom and property, we en d involve others in our doom. If we s to operate to the advantage of one ommunity, and to the disadvantage of ich no sophistry can deny, we are doing a most material injury to the state. If we grant a bounty upon exportation this year, and a bounty upon importation another year, the community are injured both ways; for in the first instance, the money price, or the value of the corn, is increased at home to the consumer; and in the next taxes must be raised upon the public to pay the bounty on importation, as well as exportation. The impolicy of the measure is therefore visible, take it which ever way you will. The bounties of 1800 and 1801 were the ruin of many a capital merchant, and I can name one or two who, under the impression of being safe by the bounty, lost above £20,000 upon the winding up of their concern, and which so nearly ruined them, as scarcely to have been able to make head against the calamity to this day. Some there were whose corn did not arrive in time, and until the new corn was brought to market; some whose corn arrived before, but who did not chuse to sell, which proving very abundant, the price fell as rapidly as it had risen, and consequently a great loss ensued. There was this spring in London several hundreds, if not thousands of quarters of wheat that was imported at that time, of which I had a sample, and though so old, was very fair, and had been very good. Only consider the expence of warehouse room for such a period, the expence of turning it over once a fortnight, or three weeks, and the loss of capital, to say nothing of the difference in the price. Here then is a proof why we ought to grow corn, and not import it; because it shews, that men like these can lock up for any period a capital without perhaps any sensible injury to them, and such men can, and do combine to monopolize and forestall, as well as to raise the markets, but the farmers themselves can do no such thing. The former, if they import largely, and buy reasonable, are not obliged to sell reasonable, they can add to the already high price, by only feeding the market; for by combining together, they can agree only to send a certain quantity each market day, enough to keep it alive, but never to depress it. Every merchant is in possession, or may read the paper of entries at the custom-house, at any of the great mercantile coffee-houses in the city, and thereby not only knows the quantity fresh imported, but by whom imported, and can readily make court to such houses for the purpose of combination. Bounties do not therefore, on that account, keep down the price of corn to the consumer, but may do the reverse.

It would seem therefore that you had rather pay foreigners for growing corn than Englishmen, for that is the inference to be drawn from bounty on importation; you had rather depend on the uncertain and preca from the Continent, than the more c mmendable one of our own country. we cannot grow it, or because it is l gislator to encourage it?

It is a certain whatever increases the sale of a producti creases the quantity of it; therefore if e bread cheap for our manufactories, w fer the exportation of corn to be constant and unobstructed. But how are we to do that if we suffer manufactures to proceed unmolested and unclogged by impositions and taxes, which find a necessary employment for a multitude of new hands, while we are every day accumulating taxes and restraints on the soil and its produce, and consequently are taking the most effectual means to prevent regular and perpetual exportation, without the assistance of something like a bounty.

If we look to the better days of France, we shall see that the policy of that kingdom was altogether in favour of manufactures, neglecting thereby the more permanent and never failing resource, agriculture. It was truly said by a very great politician of those days, that "Colbert rather depressed than promoted the interests of France, when he conceived the project of enriching it by establishing a vast number of manufactures; flattering himself at the same time, that by making the productions of his manufactures subservient to luxury, and falsely refined elegance, he should multiply the wealth of his own nation, by supplying and feeding the extravagance and vanity of other nations; but some part of the folly happened to stick where it took its rise, and became infectious at home. Under the idea of hoarding up great quantities of provisions for the support of his work folks (and that principally by obstructing the free vent and exportation of corn) this minister had the applause of the poor, who naturally favour any scheme, real or imaginary, that promises to lower the price of bread. Thus, though the French nation were intoxicated with the hopes of immense riches, and though they supplied all Europe with silks and embroideries, and expensive trifles, yet the fund of real wealth (agriculture) was deficient at bottom. Famine made its appearance frequently, and almost periodically. The proprietors of landed estates (for they, with others, at first ran into the universal notion of admiring the project) thought themselves very happy, after a considerable length of time, to advance their rents a sixth part, though money bore one third a greater value than before: imposts and taxes were increased immediately; and a considerable part of the lands (not being found, or, at least, not believed to answer the expences of cultivation) was overlooked and neglected by little and little, and at length degenerated into waste, and desolated tracts of country. All which may suffice to shew, that the cultivation of the earth, and a perfect freedom in the exportation of its produce ought not to be superseded by manufactures."

From all that I have before advanced, I think I have sufficiently proved that a free exportation of corn without bounty gives plenty, and consequently cheapness at home; and that preventing our receiving a ad (but in cases of peculiar distress) nded with the same effect, and even be understood as being imported free fi and as every other article of commerc . The farmer would, in both cases, stimulus to grow the greatest quanti ssible; he would constantly bear in emorable sentiment of Statius:

——— Steriles transmissimus annos,
Hæc ævi mihi prima dies, hæc limina vitæ.

With great deference I beg to observe, before I conclude, that it appears to me an act of extreme impolicy to make any part of agriculture a subject of taxation: the land already bears a greater burthen than commerce in proportion to its profits; where one man acquires a fortune by the former, five hundred, nay perhaps five thousand, acquire one by the latter; and taxes upon the former must fall upon the middling and lower orders of the people, who are the great bulk of the community, and who really cannot afford it. In this opinion I am not singular; the Abbé Raynal, in speaking of the policy of Spain, thus expresses himself: "The Spanish treasury having no more manufactures to oppress, now oppressed the farmers. The taxes levied upon agriculture were as ill judged as they were various and oppressive. Besides general duties, there were what the financiers called extraordinary duties, which is a mode of levying money upon a particular class of citizens; a kind of tax which does no good to the state, and ruins those that are taxed, to enrich the selfish courtier.

"These resources proving inadequate to the urgent necessities of the state, the financiers were called upon to advance considerable sums. At that period it was that they became masters of the state, and were empowered to farm out the several parts of their lease. This introduced a multitude of agents, and with them numberless oppressors. The bye laws that these rapacious men were allowed to enact, were but so many snares to entrap the honest and credulous. In process of time they usurped the sovereign authority, and found means to elude the royal tribunals, to chuse private judges for themselves, and to pay them. In short they came to be judges in their own cause.

"The owners of the lands that were crushed by this tyranny, either threw up their estates, or took no pains to improve them. That fertile Peninsula, which though subject to frequent droughts, still fed 13 or 14,000,000 of inhabitants before the discovery of America, and had anciently been the granary of Rome, and all Italy, was soon covered with thorns and briers. They contracted the pernicious habit of fixing the price of corn, and contrived to have public granaries in every commonality, which were consequently managed without either skill or honesty. Besides, what good could be expected to accrue from such dreadful measures? Who would ever think of hindering corn from fetching a good price, in order to increase the quantity of it; to make the necessaries of life more chargeable, in order to make them cheaper; or to facilitate monopoly, in order to prevent it?

"Whenever a nation has begun to decline, it seldom stops. The loss of population, of manufactures, of trade, and of agriculture, was attended with the greatest evils."

The end in other arts is ever distant and removed. It consists not in the mere conduct, much less in a single energy; because the science of agriculture consists in the just result of many energies, each of which are essential to it. If therefore we tax any of these energies, however trifling it may seem, we suspend that energy; our minds become enervated, we feel no longer inclined to pursue our course, but leave it to others, who are unacquainted with its difficulties, to prop a falling state "These "times want other aids."

REQUISITES TO IMPROVEMENT.

1. A more enlarged policy on the part of landlords, in respect to permanent improvement, and a greater latitude to the spirited agriculturalist.
2. A better system of leases, which should always be local.
3. A more diffusive knowledge in tenants.

4. A more intimate acquaintance with the use and application of the different sorts of manures, and implements of husbandry.
5. A more correct idea as to form and times of ploughing, manuring, and seeding.
6. Better arrangements in farm yards and buildings.
7. A more extended cultivation of the soil.
8. A more general inclosure of common fields, commons, heaths, &c. at a less expence.
9. A more general taste for planting upon a large scale.
10. An attention to the breeds of sheep, cattle, and swine.
11. A greater attention to the repairs and conduct of the highways.
12. A simplification of the poor laws.
13. A restriction as to the increase, and a reduction, where practicable, of the present enormous extent of public houses.
14. A complete revision of the public markets.
15. An alteration in the manner of excising hops, which ought to be ad valorem.
16. An increased attention to under drains, to the proper cleansing, and deepening of ditches, in all the heavy parts of the county.
17. A better management in the woods and coppices of the county.
18. Above all, an abolition of the present system of tithes, which is the great bane to every agricultural improvement.

CONCLUSION.

In the foregoing papers, I have endeavoured to collect the best opinions and practices on the various subjects dilated therein, which the nature of them would permit. I have carefully compared them with the customs and practices of other people and other places, and I have endeavoured to draw therefrom, and to infuse into the whole, such well authenticated facts and reasonings, as will, I hope, make them subservient to the purpose for which these volumes are designed.

In the account of the several experiments which are to be found dispersed through the work, it may perhaps be objected, that the conclusions which I have deduced from them, are not so complete as might be wished. I am ready to admit, that it may be so; but I had always in view that notable opinion of the immortal Newton, "that although the arguing from experiments and observations by induction be no demonstration of general conclusions, yet it is the best way of arguing which the nature of things admits of, and may be acted upon as so much stronger, by how much the induction is more general." And although I have in some instances spoken in positive terms, and in others been very diffuse and prolix, it must be remembered that the subjects I have undertaken to examine are by no means indifferent to the public; that I consider them to be intimately connected with the progress of agriculture, and the welfare of my country; and that a natural propensity to medi

4. A more intimate acquaintance with the use and application of the different sorts of manures, and implements of husbandry.
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with its sister science horticulture, which was the first vocation of our primæval ancestors; and both have arrived at a degree of excellence in this country within the last 50 years, which no other kingdom can parallel. By a steady perseverance in this track, under the auspices of a Board composed of the first characters in the country, there is no question of our ultimately arriving at that perfection, which, a [illegible] Virgil, Italy once acquired.

Terra poten [illegible] que ubere glebæ.

It remains [illegible] offer the warmest effusions of my [illegible] se noblemen and gentlemen, and f [illegible] gh whose personal kindness and civili [illegible] en enabled to effect so much; to en [illegible] n would be to display most of the brightest ornaments for consequence and skill, that this or any other county can boast. And as to those very few who, from whatever motives, suppressed the requested information, I must leave them to those feelings, of which even narrow and contracted minds cannot at all times be insensible.

To those who are disposed to cavil without considering the difficulties and prejudices which the author has had to encounter, he must say in his own defence in the language of Pope:

"Content, if hence th' unlearn'd their wants may view,
The learn'd reflect on what before they knew;
Careless of censure, nor too fond of fame,
Still pleas'd to praise, yet not afraid to blame;
Averse alike to flatter or offend,
Not free from faults, nor yet too vain to mend."

INDEX.

INDEX.

ABORTIO; abortive grain, vol. ii. 246
Adam, Mr. George, a great grower of potatoes, and account of his meritorious conduct in a scarcity, ii. 449
Adam, Mr. Wm, i. 98
Alder, iii. 247; use and value, 248
Aldershot, i. 1
Ale, its composition, i. 291
Analysis of soils at Camberwell, i. 264
Anderson, Dr., ii. 47, 55, 57, 83; iii. 450
Angelica, iii. 123
Anguillæ, ii. 247; iii. 434
Artificial grasses, iii. 31
Ash, ii. 213; how used, and value, 214
Ashby, the late Mr. Wm., i. 99; ii. 243; a great grower of saintfoin, iii. 42, 55
Ashes, soap, ii. 173; quantity per acre, 177
...... peat, ii. 189; quantity made per acre, 193; ditto used per acre, 203
...... cinder, ii. 203; quantity used per acre, 205
Assizes, i. 2
Atkins, Mr. Samuel, i. 48
Author's apology for defects, iii. 477
.... acknowledgements for favours received, iii. 478
Bacon, Lord, on the national profit of husbandry, i. 451
Bagshot heath, i. 123
Baker, Mr., experiments on anguillæ, iii. 434
Baldwin, Christopher, Esq, iii. 78
Bankes, Sir Jos., on blighted corn, ii. 248, 256, 257, 262, 271, 294
Barclay, Robert, Esq., iii. 83
Barley, ii. 329; preparation of soil, 331; steeping, 334; seed, 334; culture, 335; harvest, 336; produce, 336; thrashing, 336; destination, 337; malt, 338
Barrett, Mr., i. 242; ii. 329

Barrington, Lord, extraordinary growth of an oak, iii. 154
Battersea fields, iii. 341
Bauhin, Caspar, iii. 84, 121
Beech, iii. 215; its use and value, 215, 216
Beans, ii. 352; soil, 352; preparation of soil, 354; steeping, 357; seed, seed time, 357; cultivation, 358; harvesting, 360; thrashing, 360; produce, 361; consumption, 361
Beer, i. 291; its consumption, i. 297
Bees, i. 300
Benefit clubs, i. 305
Billinghurst, i. 159
Birch, iii. 216; use, 18; peculiar property of the bark, 218
Birkbeck, Mr., i. 9 59
Blackstone, on the p
Boehm, Edmund, F
Boerhaave, Dr., ii.
Bolton, Henry, Esq.
Bond, Mr., on the 274, 295
Bones, burnt, ii. 86; quantity used per acre, ii. 89
Boote, Mr., and drilling, i. 212
Borat of lime, ii. 58
Bostock, Robert, Esq., iii. 68
Box, iii. 222; use and value, 223
Bricks, i. 71; duty on, 81; price of, 82; manufacture, 82; sorts, 86; burning, 87
Brick-rubbish, ii. 138; quantity, 142
Broussonet, ii. 287, 294
Brown, Mr., on fallowing, i. 279
Buckland parish, and tithes, i. 126, 130; iii. 401
Buckwheat, number of species, iii. 84; preparation, 85; seed time, and sort, 85; seed, 86; cultivation, 86; Harvesting, 87; produce, 87; consumption, 87; value of crop, 88; observations, 88
Burnet, number of species, iii. 78; preparation, 78; sort, 78: steeping, 79; seed, 79; seed time, 79; cultivation, 79; harvesting, 80; produce, 81; consumption, 81
Burnet, Sir Robert, i. 305
Burnt grain, ii. 244
Byng, Mr., and sugar as a manure, ii. 112

Cabbage, turnip, ii. 429; preparation of soil, 430; sort, 432; steeping, 432; seed, 432; seed time, 433; cultivation, 434; consumption, 435
Cabbage, Scotch and drumhead, 435; preparation of soil, 437; sort, 438; steeping, 438; seed, seed time, 439; cultivation, 439; consumption, 440; quantity of seed per acre, 442
Cabbage, Savoy, ii. 443; preparation of soil, 443; steeping, 443; sort, 444; seed, seed time, 444; cultivation, 444; consumption, 444; weight and value per acre, 444; diseases, 445
Cabbage, red and green borecole, 446
.... Anjou, Chou de Milan, 447
Calves, i. 354
Campbell, Dr., ii. 337; iii. 102
Canals, i. 13
Capel road, i. 1
Carew, Mr., i. 5
Carmarthen, Marquis, ii. 256, 272, 274, 284
Carrots, ii. 474; preparation of soil, 475; sort, 478; steeping, 478; seed, 478; seed time, 479; cultivation, 479; harvesting, 480; produce, 481; consumption, 482
Carts, i. 223
Cattle, i. 348; diseased, sold in the London markets, 362; penalty, 362
Cautillon on the poor, i. 168
Chalk stone, i. 57; how burnt into lime, and cost, 58
Chalk, as a manure, ii. 30
Chamomile, iii. 126
Chaptal, i. 53; on charcoal, iii. 199
Charlock, ii. 96
Cherry tree, iii. 239; use and value, 240
Chestnut, iii. 231; use, 233; value, 235; remarkable tree at Lord Ducie's, 234
Chateau-vieux, M., ii. 236
Chertsey, peculiar privilege, i. 4
Cinder ashes, ii. 203; quantity per acre, 205
Clayton, Sir Wm., ii. 126
Cleanliness essential to the health of cattle, iii. 431
Clergymen improper to manage estates, i. 98, 134
Climate, i. 32

Close, the Rev. J. H., table for manuring land, ii. 227
Clover, red, iii. 31; preparation, 31; seed, sowing, 32, cultivation, 33; harvesting, 34; produce and disposal, 36; when injurious to cattle, 37; estimate of expence of culture, 38; profit and produce, 39; if fed off, 40
Clover, as a manure, ii. 152
Cobbett, Mr., ii. 317
Cockle, its varieties and origin, iii. 432
Cointereaux, Mr. F., i. 344
Coles, Wm. Esq., i. 192; ii. 111, 246
.... description of his farm at Norbury, iii. 423
Columella, ii. 377, 386
Commons, heaths, &c. iii. 336; necessity of inclosing, 338; extent of, in Surrey, 343; if advantageous or not to the poor, 346; to the farmer, 356; productive of idleness and immorality, 346; instance of, in Worcestershire, 349; generally injurious to the cattle, 357; herbage destroyed by paring for fuel, 359; Kames, Lord, on inclosures, 359; Sir. J. Sinclair's estimate of number of acres in the kingdom, 359; his valuation of them, 360; disputed, 360; disposal of in Surrey into arable and pasture, 363; profit resulting therefrom, 365; observations on inclosing, by the ministers of James I, 367
Common fields, state and extent of, in Surrey, iii. 338; profit on inclosing, 339
Concluding remarks, iii. 476
Condronchius, i. 293
Cook, Rev. Mr., and fallowing, i. 278
Corbett, father and son, very superior rural artificers, i. 182
Corn, the quantity grown, according to Mr. King, i. 306; importation and exportation, policy of bounty on, considered, iii. 450; Lord Sheffield's opinions on the subject, 450; opinions of the author of a pamphlet entitled, "An Essay on the Impolicy of a Bounty on the Exportation of Grain, and on the Principles which ought to regulate the Commerce of Grain," iii. 460, 464; Mr. Burke's opinions, 467; ill effects of the bounties of 1800, 1801, 468; Colbert's system, 470; freedom of the trade recommended, 472
Cottages, i. 108
Cottagers, their rights, i. 108
County fairs, i. 2

Cows' dung, ii. 20
Cows, i. 349; their breeds, i. 351
Cowper's Hill, i. 2
Cranstone, Major, on the fleas of hops, ii. 522
Crighton, Dr., fine specimen of gypsum, ii. 61
Croydon, i. 13
Crops, *see Rotation.*
Cucumber, wild, iii. 122
Cullen, Dr., on lime, ii. 47
Culley, Mr., i. 372
Currie, Mr., i. 359; ii. 109
Curtis, Mr., i. 448
Dahberg, Mons., i. 293
Darwin, Dr., effects of lightning on forest trees, iii. 441
Davenant, Dr., i. 170, ii. 312
Davis, Mr., on fallowing, i. 277
Dawson, Mr., his discovery of the way to make plate-glass, i. 48
Defoe on the poor, i. 143
De Lancey, General, i. 243, 362, ii. 207; his farming diary, iii. 448
Denham, Sir John, i. 4
Derbyshire, agricultural report of, i. 279
Dirom, Mr., iii. 450
Diseases of corn, ii. 235
.... fuligo, or smut, 236
.... ustilago, or burnt grain, 244
.... rubigo, or mildewed corn, 245
.... abortio, or abortive corn, 246
.... insects attacking wheat, 254
.... Hessian fly, 258, 261
.... flying wevil, 257, 260
Ditches scouring, as a manure, ii. 115; quantity per acre, 116
Dixon, Mr., i. 371
Dolben, Sir Wm., iii. 151
Dorking, famous for lime stone, i. 50
Dorset's, Duke of, account of caterpillars, ii. 288
Drabble, Mr. James, a manufacturer of machines, i. 229
Draining, iii. 373; advantages of, 374; where most requisite, 375; how performed, 375; the course of currents how dis-

covered, 377; cause of superabundant moisture in some particular places in Surrey, 379; surface waters, 381; deep ploughing recommended, 382; Lord Middleton's process of, 383; Mr. Street's, 383; General Norton's do., 384; Mr. Birkbeck's do., 386; Mr. Summer's do., 386; Mr. Wm. Saunders', 388
Drewett, Mr., i. 369; iii. 29
Dry-rot, cause of, i. 79
Duhamel, i. 286; ii. 236, 289, 290, 292, 293, 375, 377; iii. 81
Duncan, Dr., on quassia, i. 295
Dundonald, Earl, i. 285
Dutch, i. 310
East Grinstead, i. 1, 158
Earths, i. 42
Edward II. attempts to increase the revenues by destroying forests and growing corn, iii. 139
Eels of blighted corn, iii. 434; experiments on, 435
Elder, effects of, in preserving plants from flies, ii. 279
Elecampane, iii. 180
Ellman, Mr., i. 353, 372
Elsted farmers, i. 129
Elm, iii. 211; value, 213
Estates, i. 92
Evelyn, Mr., i. 335; ii. 473
Faggots, i. 311; assized, 313
Fairs, i. 2
Fallowing, i. 252; value of crops calculated, 289; value of crops without fallowing, 290
Farms, how proportioned, i. 98
Farm houses, &c. i. 103
Farm-yard dung, ii. 23
Farming buildings, gates, &c. iii. 426
Farnham, i. 1
Felbridge, i. 1
Fellmonger's poake, as a manure, ii. 92; quantity per acre, 93
.... cuttings and trotters, ii. 104; quantity per acre, 106
Fentiman's, Mr., brick-earth, i. 75
Fenwick, Dr., on lime, ii. 51

Fielding, Henry, and the poor, i. 148
Fir, Scotch, iii. 248; produce of a plantation, 251; instances of the productiveness of profit, 252, 253, 254
Fish, i. 315
Flax, iii. 90; number of species, 90; cause of diminution in growth, 91; soil, and preparation, 92; sort and seed, 94; steeping, 94; seed-time, 95; cultivation, 95; harvesting 96; curing and dressing, 97; produce, 99; value, 100; application, 100; seed imported, 104; balance against the country, 104
Fleecy hosiery, i. 2
Fletcher, Mr., iii. 49, 50, 55
Flexible tube, for the relief of cattle over-gorged, iii. 38
Flour mills, i. 8
Fly, Hessian, ii. 258, 261; method of destroying, 273; Mr. Bond's account, 274, 283
Flying wevil, ii. 257, 260
Fontana, Abbé, ii. 123; iii. 199
Fordyce, Dr. George, i. 284; ii. 60, 82
Forestalling, i. 315
Forsyth, Mr., iii. 156, 159, 188, 439; remarks on the management of forest trees, 181; his composition, 188
Fowler, Mr., i. 372
Frimly, i. 1
Frugality and industry, the cause of the prosperity of this country, i. 101
Fuligo, ii. 236
Fullers earth, i. 42; exportation prohibited, 42; sorts, 44; price, 45; analysis, 46
Fulton, Mr., on iron railways, i. 30
Furriers' clippings, as a manure, ii. 89; quantity per acre, 90
Furze, gorss or whin, iii. 112; preparation, 112; seed, seed-time, 113; cultivation, 114; produce, 114; consumption, 115
Furze ashes, as a manure, ii. 184; quantity per acre, 186
Galls on oaks, iii. 160
Gates, lamentable neglect of, iii. 426; paint, a preservative, 428
Geology, see *draining*
Gilpin, Rev. Mr., anecdote of wretchedness in a cottage, iii. 352

Giobert on the food of plants, i. 287
Glass, i. 48
Godschall, Mr., on the poor, i. 160
Gracchus, i. 155
Godstone, economical plan of supporting the poor at, i. 333
Grain cultivated, ii. 227
Granaries, i. 245; their situation and construction, 246
Grantley's, Lord, produce of grass lambs, i. 453
Grasses, artificial, iii. 31
.... red clover, 31
.... saintfoin, 40
.... lucern, 62
.... burnet, 78
.... buckwheat, 84
Gren, professor, specific gravity of oak, iii. 170
Gresham, Sir John, on stones in land, i. 335
Guide posts neglected in Surrey, i. 329; law respecting them, 331
Guillard, Mr., on unsoundness of timber, iii. 439
Gullet, Mr., on effects of elder in preserving plants from flies, ii. 279
Guthrie, Mr., opinion respecting the poor, i. 146
Guiton, M., on mortar, i. 57
Gypsum, ii. 58; use on heathy land, 61; process of preparing, 64
Hale, Lord Chief Justice, on the poor, i. 169
Hales, Dr., on smut, ii. 237
..........on hops, 518, 522
Halsey, Henry, and peat-earth, ii. 192
Handscomb, Mr., on fallowing, i. 278
Harrison, Mr. Launcelot, a grower of lucern, iii. 62
Haslemere, i. 1
Hassenfraz, on food of plants, i. 287; ii. 123
Harrows, drag, i. 213
.... seed, 214
.... bush, 215
Heathcote, Mr., on the Hessian fly, ii. 285
Heaths, Commons, &c. iii. 336; extent of in Surrey, 344
Hemp, iii. 105; growth recommended, 106; opinion that it is injurious to land, questioned, 107; imports and exports, 109

Hessian fly, ii. 258, 261, 274, 283
Higgins, Dr., on lime, i. 54; ii. 50, 52
Hodgson's, Messrs., distillery, i. 355
Hoe, turnip, i. 241
Hogs, fatted at distilleries have unsound livers, i. 327
Hog dung, ii. 26
Hollamby, Mr., iii. 2
Holland, Henry, and Pisè Walls, i. 344
Holly, iii. 244; use, 245; value, 246
Honey, Narbonne, Hyblæan, i. 303
Hooker, Mr. Reginald, on gypsum, ii. 63
Hops, ii. 495; whence brought, 498; Farnham the favourite spot, 498; soil and situation, 499; sort, 499; preparation of soil, 500; planting, 501; picking, 506; drying, 507; bagging, 509; produce, 510; charges attending a Farnham hop plantation, 511; implements, 511; polling, 513; penalty for drying with brimstone, as practised in Kent and Sussex, 515; bags, what sort, 516; poles, 516; small hop gardens unprofitable, 537; growth of the kingdom, and price, 537; average of duty for 30 years, 539; annual consumption, 540; importation greater than the exportation, 540; singularity in the growth, 543; table of the amount of duty for 92 years, ending 1801, 544
Hops, diseases and casualties, 516; a free circulation of air necessary to prevent, 534
.... wire-worm, 518
.... flea, 518
.... succeeded by the fly, 521; how to destroy, 536
.... mouldy fen, &c., Dr. Hale's account of, 522
.... honey-dews, 525
.... fire-blasts, 525
Hops, as a manure, ii. 106; quantity used, 109
Horehound, iii. 124
Hornbeam, iii. 224; use and value, 225
Horn shavings, as a manure, ii. 91; quantity per acre, 93
Horses, i. 363
Horse dung, ii. 10
Houses, number of, i. 161
Howlett, Rev. Mr., and the poor, i. 159, 160

Hunter, Dr., and carrots, ii. 485
Hussard, Mons., i. 197
Hyssop, iii. 129
Illingworth, Mr., on forestalling, i. 319
Implements of husbandry, i. 184; improvements recommended and objections answered, 186
.... ploughs, 189
.... harrows, 213
.... rollers, 216
.... horse-ho
.... carts anc
.... thrashing
.... winnowi 0
.... turnip c
.... corn st
.... ladders,
Impolicy of making a ulture a subject of taxation, iii. 472
.... Abbé Raynal's eon, 472
Ingenhousz, Dr., and fallowing, i. 284
.... on the utility of the leaves of plants, iii. 532
Improvement, general requisites, iii. 474
Inclosure, see *Commons*, &c.; observations on, by the ministers of James I. iii. 367; by Adam Smith, 371; objections to, answered, 372
Insects causing diseases of cattle, iii. 429; mode of prevention, 429
Iron, mode of separating from the soil, ii. 72
Jackson and Dampier, Messrs, manufacturers of oil cakes, iii. 100
Johnson, Mr. Brice, on quick-lime as a manure, ii. 47
Jolliffe's, H. Esq, thrashing machine, i. 284
Jones', R. B. Esq., mode of cultivating turnips, ii. 394; do. potatoes, 437
Junto of parish managers, i. 154
Kames', Lord, opinion on inclosures, iii. 359
Kent, Mr., and poor's-rates, i. 159
Kirwan, Mr., on gypsum as a manure, ii. 60, 62, 65, 68; analysis of calcareous marl, ii. 79
King's farmery at Mortlake, iii. 420

King, Mr. Gregory, on income of labourers, i. 170; his estimate of the produce of wheat in England, ii. 311; of rye, 328; of barley, 337; of oats, 351; of beans, 363; of peas, 373; of the annual value of wool, i. 449

Klaproth's, Mr., analysis of flint, i. 336; experiments on gypsum, ii. 61

Klein, Mr., uses oak leaves and saw dust for tanning, iii. 173

Knight, Mr. T. A., on sheep of the Spanish cross, i. 368

Labour, the price of, i. 183

Labourers, rural, i. 176

Ladders, i. 244

Lambs, and mode of treatment, i. 451

Land proprietors, principal, i. 94

Larch, iii. 257; its quick growth, 258; qualities, 259; uses, 261; produce, 261; estimate of a plantation, 264; situation and soil proper, 265; position and mode of planting, 266

Lavender, iii. 132

Leases, and their effects on agriculture, i. 112

Legard, Sir Digby, and successive crops of wheat, i. 278

Lightning, its effects on timber, iii. 440

Lime, M. Chaptal's plan of burning, i. 53; how to distinguish the best sort, 54

..... as a manure, which sort the best, and the strongest, ii. 50; quantity per acre, 57

..... borat of, ii. 58

Lime-kilns, Mr. Peter's, i. 51; common, or agricultural sort, 59; description of one of the best, 60; objections to it, 63; Count Rumford's plan, 63; Mr. Saunders's sort, 69; objections to it, 70; author's plan of a new one, 72

Limestone, i. 49; best pits at Dorking, 50

Lime-tree, iii. 217; use, 219; bark made into mats, 220; value of the timber, 221, advantages of its cultivation, 222

Linnæus, on galls in oaks, iii. 161

Liquorice, iii. 127

Llandaff, Bishop, analysis of brick earth, i. 75; on the utility of stones in certain soils, i. 334; their growth, 336; proportion of earth in wood, ii. 178; on the origin of galls in oak, iii. 161

Locke, on the term *Common*, i. 111; on the increase of the poor, 146

Lodden, river, i. 12
Loriot, Mr., on mortar, i. 56
Lovel, Heath, i. 1
Lucas, Mr., on cultivation of grasses, iii. 49
Lucern, iii. 62; number of species, 62; practice of a farmer near Vernon, 65; preparation, 66; sort, steeping, seed, seed-time, 69: cultivation, 70; harvesting, 71; price of seed, 74; diseases, 74; casualties, 75; treatment, 76
Lupines, ii. 148
Lushington, Sir Stephen, on sugar as a manure, ii. 112
Maargraaf, Professor, on sugar from carrots, ii. 485, 491
Mackie, Mr., on the corn laws, iii. 450
Maiuwaring's, Mr., bill to regulate butchers, i. 322
Mansions, i. 101
Manufactures, i. 6
Manures, and their importance, ii. 1
.... list of, ii. 9
.... horse-dung, ii. 10; quantity applied, 19; chemical contents, 20
.... cow-dung, 20; quantity per acre, 22; chemical contents, 23
.... farm-yard dung, 23
.... hog-dung, 26; quantity per acre, 27
.... night-soil, 28; quantity per acre, 30
.... chalk, 30; how mixed, 36
.... lime, 39; its misapplication, 42
.... gypsum, 58
.... marl, 70; quantity per acre, 89
.... furriers' clippings, 89; quantity per acre, 90
.... woollen rags, 90; quantity per acre, 91
.... horn shavings, 91; quantity per acre, 92
.... fellmongers' poake, 92; quantity per acre, 93
.... tanners' bark, 93; quantity per acre, 104
.... fellmongers' cuttings and trotters, 104; quantity per acre, 106
.... boiled hops, sour grains, &c., 106; quantity per acre, 109
.... sugar scum, 109; quantity per acre, 112
.... scouring of ditches, 112; quantity per acre, 115, 116
.... mud from ponds, 116; quantity per acre, 120

Manures, street sweepings, ii. 120; quantity per acre, 124
.... road scrapings, 124; quantity per acre, 135
.... rubbish from buildings, 138; quantity per acre, 142
.... sorrel, 142
.... lupines, 118
.... rape or cole, 150
.... red clover, 152
.... buckwheat, 154
.... vetches, 155
.... soot from pit-coal, 157; quantity per acre, 161
.... wood fires, 161; quantity per acre, 163
.... peat or turf, 163; quantity per acre, 169
.... malt dust, 169; quantity per acre, 173
.... soap ashes, 173; quantity per acre, 177
.... wood ashes, 177; quantity per acre, 183
.... furze ashes, 184; quantity per acre, 186
.... turf ashes, 187; quantity per acre, 188
.... peat ashes, 189; quantity per acre, 193
.... cinder ashes, 203; quantity per acre, 205
Maple, iii. 229; injurious to plants growing under, 230; use and value, 231
Market towns, i. 2
Marl, ii. 20
Marsh-mallows, iii. 121
Marshall, Mr., on lime, ii. 415
Mattock, the holing, an instrument for planting timber, iii. 269
Mayer, Mr., and gypsum, ii. 64
Meadows, when dressed, iii. 7; preparation, 8; why corn should not be sown with grass-seeds, 9; seed, 12; red clover improper, 14; rib-grass not proper for all soils, 15; trefoil proper for uplands, 15; white clover generally good, 15; hay seeds not proper, 16; Yorkshire hay seeds very bad, 18; proved so by Mr. Bailey, 19; manner of laying down land to grass, 19; if for sheep, what grasses, 20; if for horses, as upland pasture for mowing, 20; if for meadows, 21; poisonous plants found in meadows, 23; seed-time, 24; spring not favourable, 25; mode of sowing the seed, 26; management, 27; approved by Mr. Drewitt, 29; produce, 29; consumption, 30
Mealman, his language, i. 324
Medway, i. 12

Meikle, Mr., famous for agricultural machines, i. 233
Menzyes', Mr., thrashing machine, i. 232
Metals, i. 41
Middleton's, Lord, cultivation of carrots, ii. 476
Middleton, Mr., on the quantity of land in aration, i. 237
Millers, their practices, ii. 307
Minerals, i. 36
Mole, river, i. 8
Molling, Frederick, importer of wool, i. 374
Moore, Jas. Esq., account of his premises, iii. 116
More, Mr. Samuel, i. 270
Morgan, Col., on the Hessian fly, ii. 271
Mortar, how made, i. 55; Loriot's process, 56
Mould, the cause of dry rot, i. 79
Newnham's, Mr. John, strike-furrow plough, i. 201
.... spike-roller, 219
Nidget, or horse-hoe, i. 219
Night-soil, ii. 28
Norbury farm, description of, iii. 423
Oak, iii. 157; number of species, 157; soil best adapted, 158; how injured, 158; ivy injurious, 160; galls, account of, 160; Linnæus's account of them, 161; Bishop of Llandaff's, 161; Dr. Thornton's, 162; Count Rumford, on the solidity of the oak, 163; Locke, on the quality of oak, 165; the bark, an astringent, 166; distillation of oak, 167; produce in charcoal, 168; weight of oak, 168; value, 171; the bark, 173; faggots, and cord-wood, 176; conversion and value, 177; remarks on the grain, 179; bad method of felling, 181, 186; oaks injured by lightning, &c. 437, 440; how to prevent the ill consequences, 438; Dr. Darwin on the effects of lightning, 441
Oak-bark, preparation and price, iii. 173; season for stripping, 174
Oatlands sheep, i. 371
Oats, the sorts, ii. 340; preparation of ground, 344; seed, 345; steeping, 347; seed time, 347; thrashing and produce, 350
Oilcake, ii. 428
Orange trees, i. 5
Orchards, iii. 269; bad mode of planting, 270; neglect of the trees, 271; their proper distance, 273; pruning neglected,

275; ground should be tilled and no cattle admitted, 277; Mr. Davis's, of Longleat, opinion respecting the situation, 279; Count Rumford's ditto, 279; large orchards recommended, 281; mode of planting, position, and distance, 282; preparation of the ground, 284

Oxalis, (see *Sorrel*)

Oxen, i. 355; Messrs Hodgson's and Co., mode of fattening, 355; Messrs Cook, and Co., 357; Messrs Calvert, and Co. 358; Mr. Wheeler's large ox, 358; Mr. Cole's arrangement for fattening, 358; Mr. William Adam, 359; gentlemen who work them, 359; working supposed to injure the meat, 360;

Paget, Mr., on bones as a manure, ii. 87

Paring and burning, ii. 205

Parmentier, Mons., sago from potatoes, ii. 461

Parry, Dr. H., progress of improvement of sheep by the Spanish cross; i. 382

Parsnips, ii. 489; preparation of soil, 492; sort, 493; steeping, seed, seed time, 493; culture, harvesting, 494; produce and consumption, 495

Peas, ii. 363; preparation of soil, 364; sort, 365; steeping, seed, seed time, 366; cultivation, 367; harvesting, 371; thrashing, and produce, 372; consumption, 373

Peat ashes, ii. 189; quantity made per load, 193; quantity used per acre, 224

Penfold, Mr., produce per acre of ashes from paring and burning, ii. 207

Physical plants, their cultivation, iii. 116

.... peppermint, 119

.... spear-mint, 121

.... penny-royal, 121

.... marsh mallows, 121

.... wild cucumber, 122

.... savin, 123

.... angelica, 123

.... borehound, 124

.... chamomile, 125

.... wormwood, 126

.... liquorice, 127

.... hyssop, 129

Physical plants, elecampane, iii. 130
.... poppy, 131
.... lavendar, 132
.... roses, 133
Pisé walls, i. 344
Plaister of Paris, ii. 58
Planter, an instrument for planting timber, iii. 269
Plate-glass, Mr. Dawson's, i. 48
Pliny, on preserving corn, i. 250; on turnips, ii. 420
Ploughman, his character, i. 180
Ploughs, i. 189; Rotherham, 191; turnwrest, 193; snap, 196; single wheel, 197; Norfolk, 200; strike furrow, 200; ditto with moveable mould-board, 201; double turnwrest, 201; skim, 203; nine-share, 203; drill, 205; Cook's, 205
Ponds, i. 107
Pond-mud, ii. 116; quantity per acre, 120
Poor, their claims on society, i. 136; laws respecting vagabonds, 140; inferior alehouses, the cause of their increase, 149; expence of in England, 157, 175; how treated at South Damerham, 175; places which farm their poor, 332
Poor's rates, average amount of, in Surrey, i. 137
Poplar, its sorts, iii. 236; use, 237; value, 239
Poppy, iii. 131
Population of England, i. 175
Porter, i. 294; ingredients of adulteration, 295; mischievous effects of, 299
Potatoe, ii. 448; sorts, 448; preparation, 450; seed time, 457; cultivation, 458; consumption, 459; produce, 461; application of the fecula, 461; diseases, 462; conservation, 471
Pounds, i. 108
Pringle, Sir John, on lime, ii. 47
Public-houses, number licenced, i. 298
Pyritæ, ii. 81, 126
Quarries, i. 47
Quassia, i. 293
Railway, Surrey, i. 22; iii. 446
Rape, or cole, ii. 421; preparation, 421; soil, 422; seed, steeping, seed time, 423; cultivation, 424; consumption,

424; diseases, 424; casualties, 426; when introduced, 426; produce, 427
Rape, or cole, as a manure, ii. 150
Regrating, i. 315
Rennie, Mr. John, and the Croydon canal, i. 13
Rent, i. 124
Richmond, i. 4
Richmond park, iii. 411
Rivers, i. 5
Roads, turnpike, and parochial, iii. 286; management by trustees, 286; their powers, 288; powers of the treasurers, 289; treasurers and surveyors often ill-qualified, 293; Mr. Baldwin, and the Clapham road, 294; Mr. Thornton and the Croydon road, 295; bad state of certain roads near London, 298; Sir T. Turton's laudable exertions, 299; sum levied by tolls in England, 299; suggestions of improvement in management, 300; within the bills of mortality, 322; length of turnpike roads in Surrey, and expence, 323; queries on the state of the road, 324; weighing machines, 327; canal and railway necessary, on account of the badness of the roads, 328; remarks on the Surrey road act, 328
Road, Clapham road, iii. 305; author's plan and estimate, 305; Mr. Wildgoose's ditto, 307; remarks on it, 308; expence of his plan, 309; bad state of the road, 311
..... Croydon road, 311; Mr. Farnborough's part of the management, 311; Mr. Wildgoose's part, 311
..... Mr. Lucas, and the road from Godstone to Felbridge water, 314
..... from Riegate to the Sussex oak, 315
.... Tooting through Merton to Epsom, 316
.... Leatherhead to Dorking, 317; to Clandon, 317
.... Clandon to Guildford, 317
.... Kingston to Guildford, 317
.... Ditton, 317
.... through Esher, 318
.... Guildford to Godalming, 318
.... through Shalford, 319
.... to Farnham, 320
.... Farnham to Staines, 321

Road from Kingston to London, iii. 321
..... expenditure of several lines of road for the last seven years, 332
.... Stones-end and Kennington, (Mr. Thornton) 332
.... Croydon, (Mr. Wilkinson) 332; (Rev. Dr Bullock) 333; (Mr. Chatfield) 333
.... East-Grinstead, (Sir Wm. Clayton) 333; (Mr. Lucas) 334
.... Kingston, (Mr. Lett) 334
.... Sutton, (Mr. Prescott) 334; (Mr. Bush,) 335
.... Camberwell, (Mr. Crespigny) 335
.... Stockwell, (Mr. Tyler) 335
Road scrapings, ii. 124; quantity per acre, 135; experiments on, 127
Rocks, i. 36
Roberjot, Mons., mode of destroying insects, ii. 293
Rollers, i. 217
Romney's, Earl, growth of parsnips, ii. 491
Rose, Mr., and the poor, i. 175, 305
Roses, iii. 133
Rotation of crops, iii. 389; Mr. William Adams's plan, and general system of farming, 390; Thomas Cole's, Esq., 392; Mr. Farley, 392; from Croydon to Godstone, 393; from Godstone, 394; Mr. Sandiland, 395; Mr. T. Lucas, 395; Mr. Marchant, 395; Mr. R. Bostock, 395; Mr. Smith, 395; Mr. Ewart, 395; Mr. Woodroffe, 395; about Horne, Burstow, and Horley, 397; H. Hoare, Esq., 397; about Sutton, 398; about Cheam, 399; Mr. Hilbert, 399; late Mr. Ashby, 400, 403; Mr. Shallcross, 400; Mr. Wm. Clutton, 400; Mr. Pryor, of White's Green, 401; from Mitcham to Sutton, 401; Sutton to Ryegate, 402, beyond Ryegate, 406; Ewell, 407; from Ewell to Dorking, 407; Betchworth, and about Dorking, 408; Dorking to Guildford, (Mr. Lomax,) 410; Leatherhead to Guildford, 410; Richmond park, 411; the late Mr. Ducket of Esher, 412; Lord King, at Ripley, 413; Mr. Drewet, at Send, 414; near Guildford, 415; through Shalford and Bramley to Awfold, 416; Lord Grantley, 416; from Guildford to Haslemere through Godalming, 417; from Guildford to Farnham, 418; from Farnham by Chertsey to

Kingston, 419; Oatlands, 419; from Kingston to Vauxhall, 420
Rotheram, iii. 84
Rubigo, ii. 245
Ruckert's analysis of soap ashes, ii. 176
Rumford, Count, his plan of a lime kiln, i. 63; on the poor, 144, 156; on potatoes, ii. 473
Runnymead, i. 4
Rye, ii. 326; seed, seed time, 326; value of the straw, 327; soil proper, 327; estimate of the produce, 328
Saintfoin, iii. 40; number of species, 40; extent of growth, 41; preparation of ground, 42; best mode of sowing, 44; seed, 46; steeping, seed time, 47; cultivation, 49; harvesting, 51; produce and value, 52; quantity of seed produced per acre, 54; consumption, 54; how soon crop may be repeated, 56; extraordinary crop at East Horsley, 57; Mr. Smith's account of saintfoin, 58; more advantageous to sow it without than with corn, 60
Salisbury, Marquis, cultivation of carrots, 487
Saunders, Mr., on gypsum, ii. 66; not an advocate for water meadows, iii. 2
Savin, iii. 123
Saxony, elector of, encourages the Spanish breed of sheep, i. 374
Selenite, ii. 82, 126
Sewell's, Mr. John, compost, iii. 83
Shaws, i. 107
Sheep, i. 363; the different breeds, 363; the Merino, why good, 363; ditto at Oatlands, 371; their several generations described, 379; wool produced, 385; Baron Shulz's account of, 386; Teissier and Huzard's report, 388; Elector of Saxony, a promoter of the Merino breed, 374; King of Prussia ditto, 390; extracts from Lord Somerville's tracts, 394; from Mr. Bartley's, 395; value of carcass and wool of some sheep of the Spanish cross, bred by Lord Somerville, 419
Sheep, diseases of, i. 431; Dr. Harrison's account of the rot and prevention, 441
Shipley and Co. manufacturers of oil cake, iii. 100
Simmons, Mr., and fallowing, i. 277
Sinclair, Sir John, on the quantity of land employed in raising

Smith's, Mr., composition for cure of trees, iii. 192
Smithfield market, i. 322
Smut, ii. 236
Soil and situation of Surrey, i. 33
Solicitors, improper to manage estates, i. 94
Somerville, Lord, extracts from his tracts on sheep, i
  produce of his Spanish cross, 419
Sorrel, ii. 142
Soot, from pit coal, ii. 157; quantity per acre, 161
.... wood fires, 161; quantity per acre, 163
.... peat or turf, 163; quantity per acre, 169
Spallanzani, Abbé, on insects which disorder cattle, iii. 4
Spearmint, iii. 121
Spencer, Earl, and timber, iii. 142
Stanhope's, Earl, lime, i. 56
Steeping, ii. 232
Steer, Mr. Wm., and water meadows, iii. 2
Stirling's, Mr., thrashing machine, i. 232
Street's, Mr., turnip chopper, i. 241
Stone quarries, i. 47
Stones, i. 333
Street sweepings, ii. 120; quantity per acre, 124
Sugar-scum, ii. 109; quantity per acre, 109
Surrey iron railway, ii. 447
Sylva, Mr., on fullers' earth, i. 44

Thurlow, Lord, and Mr. Wm. Adam, iii. 390
Tiles, duty on, i. 81; compared with slates, 89
Timber, general outlines of, iii. 135; King William planted 4000 acres, 138; Heylin's reasons for the decay of timber, 139; forests destroyed by Edward II, for raising corn, 139; soil of England well adapted, 141; stock in dockyards, 142; consumption of England, 143; present stock in the kingdom, 144; destruction of timber on one estate, 147; trees at White's Green, at Becket's, at Lingfield, 154; at Tredegar, 155; implements for planting, 269; injured by the lightning, 437, 440; how to cure, 438; premature decay of the trees in St. James's park accounted for, 443; opinion of celebrated poets on the importance of, 445, 446
Timber, oak, 157
.... elm, 211
.... ash, 213
.... beech, 215
.... birch, 218
.... lime, 218
.... box, 222
.... hornbeam, 224
.... walnut, 225
.... maple, 229
.... chestnut, 231
.... poplar, 236
.... cherry, 239
.... yew, 240
.... holly, 244
.... alder, 247
.... Scotch fir, 248
.... larch, 257
Tirrel, Mr., and water meadows, iii. 2
Tithes, great, i. 125; vicarial, 128; history of, and arguments against, 130; further arguments against, 337
Tollet's, George, Esq., sheep of the Spanish cross, i. 368
Tong, Mr., and gypsum, ii. 66
Tull, Mr., on smut, ii. 240
Try, Mr. Edward, peculiar process for making oil cake, ii. 428
Turf ashes, ii. 187; quantity per acre, 188
Turnips, the sorts, ii. 387; preparation of soil, 397; steeping,

seed, 398; seed-time, 401; cultivation, 403; value, 403; how consumed, 405; diseases, 406; casualties, 407; curious account of the Swedish turnip, by Dr. Campbell, 417; weight, 420; quantity necessary for an ox or sheep, 420
Underwoods, iii. 192; value of, 195; made into charcoal, 197
Ustilago, ii. 244
Vavasor, Sir Henry, on carrots, ii. 486
Vermin, i. 313
Vetches, see *tares.*
Waggons, i. 225
Walls, Pisè, i. 344
Walnut, iii. 225; its fruit, 226; use of the timber, 227; value, 228
Walpole, Mr., on the flying wevil in Bavaria, ii. 272
Wandle, river, i. 5
Warrington, Mr. John, and corn jobbers, i. 320
Were and Co., Messrs., manufacturers of oil cake, iii. 100
Weston, Sir Richard, on flax, iii. 101
Wey, river, i. 10
Wheat, ii. 227; sorts, 228; steeping, 232; diseases, 235; quantity sown, 296; period of sowing, 297; management, 300; harvest, 302; thrashing, 304; remarks, 311; value, 311; quantity imported and exported, 313; bounties paid, 313; regulations proposed by the corn committee, 324
Wheat-frames, i. 242
Wheels, i. 342
Wilkinson, Dr., on lime as a manure, ii. 48
Winnowing machines, i. 240
Wood ashes, ii. 177
Woodroffe, Mr., i. 200
Wool, exportation prohibited in Spain, i. 416; pitch marked wool used as a manure, 448; estimate of the value of wool. 448; penal statutes relating to, 451, see *sheep*
Woollen rags, as a manure, ii. 90; quantity per acre, 91
Wormwood, iii. 126
Wright, Sir James, estimate of damage occasioned by rats to corn, i. 340
Yew tree, iii. 240; use, 243; large tree at Crowhurst, 241
Young, Sir Wm., on the poor, 164

THE END.

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